ALEXANDRA FRANCES KIMBER (HILES) BSc (Hons), MSc

SPORTS PARTICIPATION FOR INDIVIDUALS WITH AUTISM SPECTRUM CONDITION (ASC)

Section A:

An exploration of the experiences of young people with Autism Spectrum Condition (ASC) and parents/carers of young people with ASC of physical activity

Word Count: 7997 (583)

Section B:

"It's all about knowing the young person": Best practice in coaching athletes with Autism Spectrum Condition (ASC)

Word Count: 7929 (677)

Overall Word Count: 15926 (1260)

A thesis submitted in partial fulfilment of the requirements of Canterbury Christ Church University for the degree of Doctor of Clinical Psychology

APRIL 2019

SALOMONS CENTRE FOR APPLIED PSYCHOLOGY
CANTERBURY CHRIST CHURCH UNIVERSITY

Acknowledgments

I would like to express my gratitude to the participants of this study. It was inspiring and moving to hear their experiences and see their commitment and dedication to disability sport. Thank you also to my supervisors, Jan Burns and Mark Murphy for their generous support and guidance. To my partner, Adam, for his love, encouragement and positivity throughout, and to my dad, who continues to guide me through life's challenges. Finally, thanks to my wonderful Grandmother, Jean, who sadly passed away during this journey, but who taught me the courage, strength and determination I needed to complete this work.

Summary of the MRP portfolio

Section A

A review of the literature exploring the experiences of young people (YP) with Autism Spectrum Condition[1] (ASC) and parents of YP with ASC, of physical activity programmes at school and within the community. Factors such as personal interests and availability of community programmes were found to impact participation levels. Importantly, YP generally felt positively towards physical activity and enjoyed participating. Future research could explore how to better facilitate engagement in sports for this group and consider physical activity interventions in relation to difficulties associated with ASC.

Section B

A qualitative study which explored the experiences of coaches of athletes with ASC. Ten experts in the field were interviewed to share their knowledge of what works well, what doesn't work well and how coaching might be improved. Thematic analysis of the data identified five themes. The coach-athlete relationship was one of the most salient ideas emerging from the data, focussing on the importance of getting to know the YP and understanding their individual needs. As this has not been explored in detail with an ASC population before, this study has several implications for future research and clinical work.

[1] The term Autism Spectrum Condition has been used throughout this work. This is the current term favoured by many however, may in future be replaced and as such will then be outdated. This note is to acknowledge the complexities of language and terminology.

Table of Contents

List of Tables

List of Figures

List of Appendices

Section A

Section B

Section A

An exploration of the experiences of physical activity of young people with Autism Spectrum Condition (ASC) and parents/carers of young people with ASC

Word Count: 7997 (583)

ALEXANDRA FRANCES KIMBER (HILES)

APRIL 2019

A thesis submitted in partial fulfilment of the requirements of Canterbury Christ Church University for the degree of Doctor of Clinical Psychology

SALOMONS CENTRE FOR APPLIED PSYCHOLOGY
CANTERBURY CHRIST CHURCH UNIVERSITY

Abstract

Aims

This review aimed to explore the experiences of young people (YP) with Autism Spectrum Condition (ASC) of participating in physical activity. It also aimed to investigate what parents' and carers' views were on this subject.

Methods

Twelve research papers were identified by conducting a systematic search of four online databases. The findings from these papers were synthesised and then critiqued based on quality assurance tools. Clinical and research implications were considered before drawing conclusions.

Results

The evidence from the papers reviewed suggests YP with ASC and parents of YP with ASC hold positive views about physical activity. In line with parental views, YP commented on physical activity being fun and beneficial. Barriers to participation related to characteristics such as preferring technology-based activities and lacking an exercise partner. Facilitators included appropriate and structured provision and use of rewards.

Conclusions

Further research is required to explore in more detail the facilitators and barriers to physical activity for YP with ASC. The papers reviewed here suggest that YP with ASC enjoy physical activity and would like to participate more. The knowledge and expertise of the coach was considered vital and thus research investigating this would be beneficial.

Keywords: Autism, Sport, Experience, Parents, Participation

Introduction

For many people sport is an important part of their identity. Great sporting events can influence the way we think, feel and behave, as seen by the spike in sports participation and the community spirit raised by the London 2012 Olympics (Thornton, 2012). Events such as this inspire more people to get out and take part in some form of physical activity (PA) and encourage local councils and government to provide more opportunities for this (Sport England, 2012). While it is relatively easy for the majority to take advantage of this increased provision, some individuals face significant challenges in accessing such community resources and thus do not benefit from the same opportunities as the rest of the population. This review will explore this idea of participation in further detail for young people (YP) with Autism Spectrum Condition (ASC).

PA and Wellbeing

PA and physical health. The health benefits of leading a physically active lifestyle are well documented. Regular PA is considered vital for good physical health and a large body of evidence suggests frequent exercise is related to reduced incidence of many chronic conditions. The risk of cardiovascular disease, coronary heart disease and stroke is reported to be 20-35% lower for those who are physically active (Department of Health, 2011). The risk of type 2 diabetes and metabolic syndrome is 30-40% lower in those who are at least moderately active compared to those who are sedentary (Department of Health, 2011).

PA guidelines and current levels. In 2011, new guidelines were issued regarding the amount of PA recommended for good health (Department of Health, 2011). PA is defined as any form of activity including everyday pursuits such as walking to work, active recreation such as gardening, and competitive sports such as football (Department of Health, 2011). Guidelines recommend everyone aim to engage in PA daily. Adults should aim to accumulate 150 minutes of moderate intensity activity over one week and children should aim to be active

for at least 60 minutes per day. The guidelines stress the importance of including activity that strengthens muscles and bones and to reduce time spent in sedentary activities. In 2018, an Active Lives Survey (ALS; Sport England, 2018) reported 62% of adults to be active, while 25% were classified as inactive, the remaining 13% were classified as fairly active

PA and psychological wellbeing. The benefits of achieving the recommended guidelines for PA extend beyond physical health. Research has demonstrated PA can also have a positive impact on psychological well-being. In adults, various types of PA, particularly aerobic exercise such as running, has shown to enhance mood, reduce symptoms of depression and anxiety and increase self-esteem (Steinberg et al., 1997; Stathopoulou, Powers, Berry, Smits, & Otto, 2006; Tsang, Chan, & Cheung, 2008). These improvements have been demonstrated even after a single session (Brand et al., 2018). The impact of PA on depression, has been recognised by the National Institute for Health and Care Excellence (NICE), who advise individuals with mild depression to follow a moderate exercise programme (NICE, 2009).

While evidence for the relationship between PA and psychological wellbeing in YP is more limited, positive psychosocial benefits have been reported, including improvements in symptoms of depression and anxiety, increased self-esteem and happiness, improved cognitive functioning and social outcomes (Biddle & Asare, 2011; Fedewa & Ahn, 2011; Strong et al., 2005; Strauss, Rodzilsky, Burack, & Colin, 2001).

Theories of Wellbeing through PA

The development of theoretical constructs has helped our understanding of participation in PA and its positive impact on psychological wellbeing. Such frameworks developed and applied to PA include the Psychological Continuum model (PCM; Funk & James, 2001) and Socio-Ecological theory (Mehtälä, Sääkslahti, Inkinen, & Poskiparta, 2014). Beaton, Funk & Alexandris (2009), recommend PCM as the most relevant model to draw upon to understand participation in PA, as it explains participation through the psychological relationship an

individual may form with a sport object such as a team or activity. A limitation of this however, is the lack of consideration of the impact of characteristics within the physical environment.

The socio-ecological approach does address this limitation, understanding behaviour through the interactions between an individual and their environmental contexts. This takes a more systems level approach and considers the contribution of PA to promoting engagement and guiding approaches to population-wide health issues (Rowe, Shilbury, Ferkins, & Hinckson, 2013; Stokols, 1996).

A model derived from the social-ecological approach is the Health through Sport (HTS) Model (Eime, Young, Harvey, Charity, & Payne, 2013; figure 1). Developed through a systematic review on psychological and social benefits of sport for children, it goes some way in helping to identify the contributing factors and outcomes relating to PA participation. Strengths of the model include its consideration of both the contextual and individual elements relating the PA to the person and its capturing of the complexity of the connections between determinants and benefits. However, the review did not include all forms of PA and as such, the model is limited with regards to the benefits of participation in active recreations such as gardening.

As figure one shows, it involves three major elements: the determinants driving PA, sport itself, and benefits of participation. The determinants are represented as broadening concentric circles, beginning with intrapersonal characteristics that may influence participation and spreading to widening spheres of influence. In the middle is sport itself, which may be individual or team-based and organised or informal. Each of these are represented as dichotomous but have some variants, for example running alone vs. running in a group. The final aspect of the model is the health outcomes of PA. These are separated into three primary categories: physical, psychological and social, but overlap to represent two secondary categories (psychosocial and psychophysiological), demonstrating the interactions between them such as the relationship between physical fitness and mental state.

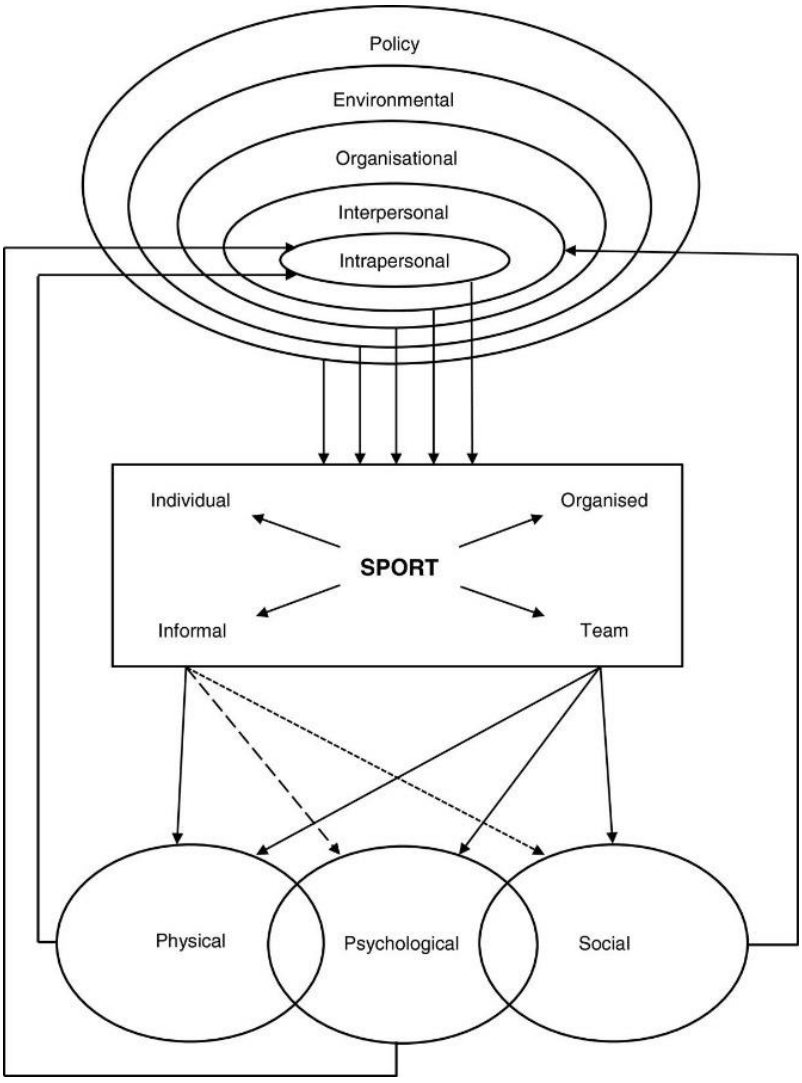


Figure 1. HTS conceptual model (Eime et al., 2013)

Disability Sport

In considering disability sport, it is vital to understand the different models of disability. So far, research in PA participation has largely ignored disability studies yet, such models can provide important ontological and epistemological platforms for exploring and understanding participation, learning and development in PA (Townsend, Smith, & Cushion, 2016). The present review aligns itself most closely with the social model of disability (Llewellyn & Hogan, 2000). While the medical model is perhaps the most dominant approach within research and wider society, its focus on individual impairment is unsatisfactory. It largely ignores the role of contextual and societal discourses and factors which, the social model argues to be the root cause of disability. Instead, the social model delineates impairment from

disability, postulating ill-adapted environments to be disabling to those with impairments (Llewellyn & Hogan, 2000). While disability-specific PA models do not yet exist and thus could not be drawn upon, Eime et al.'s (2013) model fits well with the social model of disability, considering both individual and systemic factors influencing participation and engagement.

ASC. ASC is a complex neurodevelopmental condition characterised by impairments in social communication and social interaction, alongside restricted or repetitive patterns of behaviour, interests or activities and sensory sensitivities (American Psychiatric Association, 2013). It occurs in approximately 1.1% of the UK population (Brugha et al., 2012). As a consequence of the difficulties associated with ASC, some individuals may find it challenging to live independently, to form friendships and to be involved in community activities (Eaves & Ho, 2008; Hilton, Crouch, & Israel, 2008). Individuals with ASC are also considered at greater risk of comorbidities, including physical health conditions such as obesity (Curtin, Jojic, & Bandini, 2014), mental health conditions such as anxiety and depression (Simonoff et al., 2008) and motor skills deficits (Dziuk et al., 2007; Jansiewicz et al., 2006; Minshew, Sung, Jones, & Furman, 2004). Current interventions include speech and language therapy, occupational therapy and behavioural interventions (e.g. applied behaviour analysis; Myers, Johnson, & American Academy of Pediatrics Council on Children With Disabilities, 2007). While these interventions are sometimes helpful in managing some of the difficulties associated with ASC, research has begun focussing on other evidence-based interventions that may improve an individual's quality of life, for example, PA (Tan, 2011; Taylor et al., 2012).

PA patterns in YP with ASC. YP with ASC have been reported as being less likely and less willing to engage in PA than both typically developing (TD) YP and YP with other disabilities (Pan, 2008; Srinivasan, Pescatello, & Bhat, 2014). Pan and Frey (2006), reported YP with ASC to participate in very few sustained bouts of moderate to vigorous PA, with most of their PA occurring during the school day. These statistics are concerning given the increased

prevalence of physical and mental health conditions in this population. If ASC is considered within the context of the social model of disability, we may better understand how sporting contexts, such as clubs not knowing how or what support to provide, might explain the limited engagement in PA of this population.

PA and wellbeing for individuals with ASC. Limited research exists exploring the benefits of PA for those with ASC, with most focussing on physical health outcomes (e.g. Pitetti, Rendoff, Grover, & Beets, 2007). Some studies have begun however, to consider the positive impact PA might have on the core features of ASC. Improvements in social behaviour (Pan, 2010), communication skills (Hameury et al., 2010), stereotyped behaviours (Yilmaz, Yanardağ, Birkan, & Bumin, 2004; Elliott, Dobbin, Rose, & Soper, 1994) and sensory sensitivities (Bass, Duchowny, & Llabre, 2009) have all been demonstrated in individuals with ASC after participation in PA. Although limited, research has also investigated the effects of PA on additional difficulties associated with ASC, demonstrating improvements in behaviour that challenges (Allison, Basile, & MacDonald, 1991). In a systematic review, a variety of exercise interventions were found to result in reduced behaviours such as stereotypy, aggression and off-task behaviour (Lang et al., 2010).

Summary and Rationale

There is good evidence to suggest PA is beneficial for physical and psychological wellbeing. Despite this, YP with ASC are frequently excluded from participation and are often less active than TD YP. The social model of disability explains how PA patterns of YP with ASC may be more affected by social constraints than the actual impairments from the condition. This review aims to bring together literature about the experiences of YP with ASC and parents of YP with ASC in PA participation. It is hoped this will help in understanding the barriers and facilitators to PA for this population, and the areas in which development should be focussed to increase enjoyment, satisfaction and engagement.

Method

Aims

This review will provide a summary of published literature investigating the experiences of YP with ASC and parents/guardians of YP with ASC. It will aim to address the following questions:

1. What are the experiences of YP with ASC of participating in PA?
2. What are the experiences of parents of YP with ASC of their child participating in PA?

Scope

The focus of this review was on PA. PA can include everyday pursuits, active recreation, or competitive sports (Department of Health, 2011). Similarly, to Eime et al. (2013), papers with a focus on non-active community or leisure activities were excluded from review to form more reliable conclusions about PA itself. Some excluded papers therefore may have contained PA data which was missed. One example of an excluded paper of this kind was, Egilson et al. (2017). The authors investigated community participation of children with ASC, discussing participation in a range of activities such as, "community events", "unstructured physical activity" and "religious or spiritual gatherings". Despite some PA being captured in this study, this was not the focus of the paper and thus conclusions about PA itself were not drawn by the authors.

The review was also limited to papers including individuals with a diagnosis of ASC. While some participants may have had additional comorbid diagnoses, such as Intellectual Disability (ID), or Attention Deficit Hyperactivity Disorder, these conditions were not reviewed in their own right.

Literature Search

An electronic literature search was conducted using four databases: PsychInfo, EBSCO HOST, Web of Science, and SportDiscuss. The search was conducted on 12th November 2018

using the following search terms: Autism* OR ASD OR ASC OR Neurodevelop* OR Pervasive Developmental Disorder OR Asperger* AND physical activit* OR exercise OR physical OR recreation OR leisure OR fitness OR athletic* OR sport OR play* OR communit* AND experience* OR perspective OR perception OR feel* OR enjoy*. The searches were limited to those published in English but were not limited to a time period to maximise the scope of the review. The search retrieved 485 articles (see Figure 2 for a Prisma diagram of selection process; Moher, Liberati, Tetzlaff, Altman, & Group, 2009). Following screening of titles and abstracts, 15 full-text articles were screened, leaving 12 papers for final review. The reference lists and citing articles of key papers and previous review articles were also screened to ensure all relevant papers were located, this identified no new papers. Finally, a Google Scholar search was conducted, also producing no new papers. When screening, the inclusion and exclusion criteria outlined in Table 1 and Table 2 were applied. The details of the 12 articles identified are presented in Table 3.

Table 1

Inclusion criteria applied to selection process

Inclusion criteria	**Justification**
Participants: YP with ASC (mean age = 18 or less) or Parent of YP with ASC.	YP were the focus of this review due to current research suggesting YP with ASC engage in significantly less PA than TD YP (Pan & Frey, 2006). It was hoped understanding YP's and parent's experiences of PA might enable better inclusion and participation for YP. It is also understood that YP who are active tend to go on to be active adults and so early intervention is key (Telama et al., 2014).
Papers involving PA at school or in the community	Both school and extra-curricular PA were included to ensure the capture of activities such as physical education as well as opt-in sports programmes of varying levels.
Peer reviewed	To ensure a minimum standard quality.

Table 2

Exclusion criteria applied to selection process

Exclusion criteria	Justification
Main focus on disabilities, not ASC specific	Individuals with ASC are often categorised within the context of other comorbid diagnoses, such as intellectual disability (ID). Those who do not have a comorbid diagnosis therefore often fall between the gaps in service provision. This review aimed to focus on ASC specifically, highlighting what the experiences, barriers and facilitators are of participation for this group.
Individual with an ASC is an adult	As discussed in Table 1, YP have been focussed on due to the potential for proactive intervention
Main focus on non-sport-based leisure or community activity	As discussed in the scope section, activities that included non-active pursuits such as painting or cooking were not included to ensure a focus on PA.

The key findings from the 12 articles selected will be summarised, with themes from the research being discussed. A critique of the literature will then be made, drawing on quality appraisal checklists from the Joanna Briggs Institute Reviewers Manual (JBI; Aromataris & Munn, 2017;) and the Mixed Methods Appraisal Tool (MMAT; Hong, Gonzalez-Reyes, & Pluye, 2018). Completed checklists are provided in Appendix A. These informed decisions regarding exclusion of papers. While no minimum standard was set due to the variety in methodologies, the checklists had scope for considering whether the critiques generated were enough to exclude each paper. These standards were used to create an evaluation table of included papers, presented later (Table 4). This outlines in more detail, the nature of the bias or critique raised by the checklists. Bearing the critique in mind, clinical and research implications will be presented, and conclusions drawn.

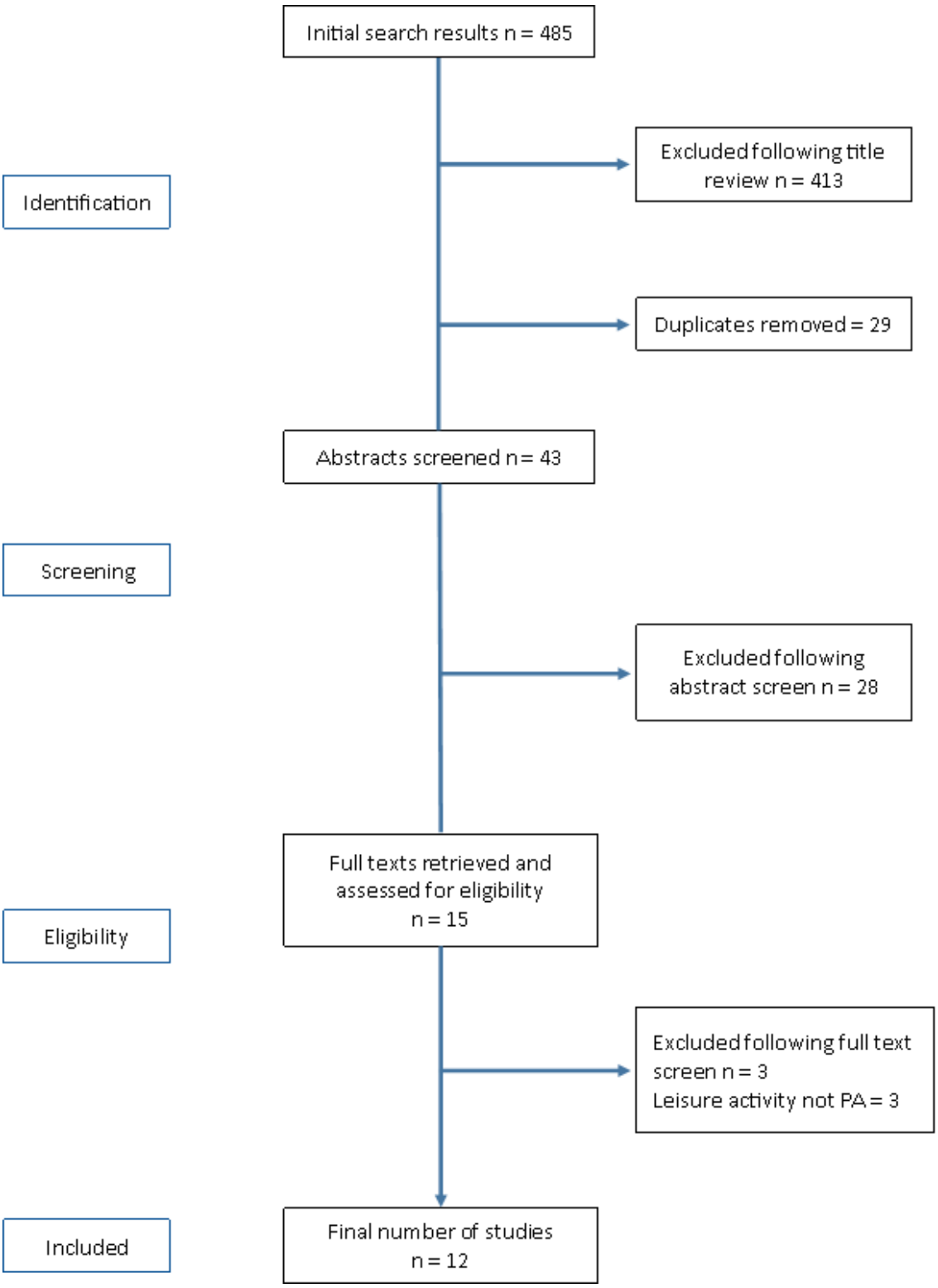


Figure 2. Prisma diagram of paper selection process

Table 3

Details of Papers Selected for Review

Author(s) and Date	**Focus of Paper**	**Design**	**Method**	**Sample**
Arnell, Jerlinder, & Lundqvist (2018)	To understand how adolescents with ASC perceive, experience and reflect on their participation in PA	Qualitative	Semi-structured interviews	24 adolescents with ASC. m=17; f=7. Aged 12-16 years.
Ayvazoglu, Kozub, Butera, & Murray (2015)	Focussed on determinants of PA in children with ASC. Also looked at levels of PA in children and their parents	Mixed methods	1. Quantitative: Accelerometer 2. Qualitative: Q-sort methodology 3. Qualitative: semi-structured interviews	6 families with child with ASC. m=4; f=2. Aged 4-13 years.
Blagrave (2017)	Providing space for children with ASC to communicate their experiences of adapted PE classes	Qualitative	1. Drawing 2. Observation 3. Structured interview	10 YP with ASC. m=9; f=1. Aged 10-14 years.
Gregor et al., (2018)	Gaining an understanding of parents' perspectives of PA participation for their child with ASC	Qualitative	Semi-structured interviews	10 parents of YP with ASC. 9 mothers; 1 father. Children aged 11-21 years.
Healy, Msetfi, & Gallagher (2013)	Gaining an insight into experiences of children with ASC of PE classes	Qualitative	Semi-structured interviews	12 YP with ASC. m=11; f=1. Aged 9-11 years.
Lamb, Firbank, & Aldous (2016)	Exploration of PE through the eyes of children with ASC	Case study	1. Photo-elicitation 2. Unstructured interview	5 YP with ASC. m=4; f=1. Aged 11-16 years.
Lee, Haegele, & Chang (2017)	Exploring the satisfaction of parents of children with ASC towards PE/adapted PE teachers	Cross-sectional survey	Survey: Parent perceptions toward adapted physical education teachers (PPTAPET)	41 parents of YP with ASC. Children aged 3-18+ years.

May et al., (2018)	Explored parent experiences of and influence on child participation in an adapted sports programme for children with ASC	Qualitative	Two phased research. Reporting on phase 1 only here. Semi-structured interviews with parents.	15 families with child with ASC. Children all male. Age m=5. 9 years. Interviews: 4 mums/5 dads
Must, Phillips, Curtin, & Bandini (2015)	Compared the prevalence of child/family, social and community barriers to PA between children with ASC and TD children. Also assessed association of parent-perceived barriers to PA and levels of PA and screen-time	Cross-sectional	Three questionnaires: 1. Barriers to physical activity 2. Assessment of physical activity 3. Assessment of screen-time	Parents of YP with ASC & TD YP. ASC (n=53): m=83%; f=17%. Aged 3-11 years. TD: m=78%; f=22%. Aged 3-11 years.
Obrusnikova & Cavalier (2011)	Assessed barriers and facilitators to after-school participation in PA as perceived by children with ASC	Qualitative	1. MVPA 2. Accelerometery 3. Photovoice (digital photography, online questionnaire, semi-structured interview)	14 YP with ASC. m=12; f=2. Aged 8-14 years.
Obrusnikova & Miccinello (2012)	Assessed parental perceptions of benefits of PA and factors that influence participation of children with ASC in PA after school	Mixed methods	1. Online questionnaire 2. Focus group interview	103 parents of YP with ASC. YP (n=100): m=85; f=15. Aged 5-21 years
Stanish et al., (2015)	Compared PA enjoyment, perceived barriers, beliefs and self-efficacy between adolescents with ASC and TD adolescents.	Cross-sectional	Closed questionnaire delivered as structured interview	YP with ASC & TD YP. ASC group (n=35): m=29; f=6. Aged 13-21 years. TD group (n=60): m=36; f=24. Aged 13-18 years.

Literature Review

Synthesis of the Literature

What are the experiences of YP with ASC of participating in PA? Six of the reviewed papers explored experiences of YP with ASC of PA. This included participation in after-school sports activities and Physical Education (PE) classes. One important finding, as demonstrated by Blagrave (2017), was YP with ASC appear to enjoy PA. In her mixed methods study of school-aged children's experiences of their adapted-PE (APE) sessions, she reported YP's positive sentiments regarding participation. By providing children with different means of communicating their views, including drawings, observation and a semi-structured interview, a rich picture of their experiences was gained. Blagrave (2017) discussed the theme of "enjoyment in participation", commenting that all participants reported some positive aspect of their APE sessions. Participants in this study however, were all verbally communicative, meaning little was learnt about the enjoyment of APE classes from YP with ASC with poorer language abilities. Data was also collected at only one time-point, perhaps not accounting for the ups and downs of individual's experiences over time.

Stanish et al. (2015), who verbally administered a questionnaire to adolescents with ASC and TD adolescents, also provided support for YP with ASC enjoying PA. In their cross-sectional study, they compared responses between groups of YP with ASC and TD YP on enjoyment, barriers to participation, beliefs and self-efficacy. Although again, these participants were all able to communicate verbally, limiting the generalisability of the findings, 59% of YP with ASC reported PA to be "a lot of fun". While this is somewhat in line with Blagrave's (2017) findings, this was significantly lower than the TD group, 75% of which felt PA was "a lot of fun". Additionally, the findings demonstrated 65% of the ASC group enjoyed team sports. It is worth noting, the YP in this study were individuals who regularly engaged

in PA. The views of those who do not regularly participate therefore, perhaps due to lack of enjoyment, were not explored.

Lamb et al. (2016), reported 4/5 participants to have talked about enjoying some aspect of PA. In this small-scale case study, YP were provided with an iPad to take photos representing their experiences of PE and then engaged in a semi-structured interview to make meaning of the photos. In investigating the theme of enjoyment with regards to team sports, Lamb et al. (2016) hypothesised participants' enjoyment was based on their experience of playing games with limited and explicit rules which, require little linguistic interpretation, such as dodgeball. They quoted one participant as stating, "All you have to do is just run, get the ball and then throw it and hope you don't get one thrown at you". They took a balanced view of enjoyment, describing one participant's responses who, although reported to enjoy PE as it made him feel happy, also discussed many negative aspects, such as worrying about not getting the ball and being excluded. The authors concluded small-scale games with specific conditions were perhaps most enjoyable for YP with ASC. They suggest enjoyment may stem from gaining social capital or in instances where success is easily measured (e.g. shooting practice in basketball). Conclusions were drawn about providing athletes with an opportunity to be expert in something, allowing for a sense of achievement and feeling valued as a team member.

Some papers commented more broadly on YP's experiences of the social aspects of sports participation. Healy et al. (2013), who interviewed 12 young people with ASC to explore their experiences of PE classes, found relationships and experiences with peers to be a key theme across their data. The authors discussed the theme 'peer interactions', encompassing both positive and negative aspects of social interactions. They highlighted how some participants enjoyed the camaraderie between peers during games and being in a team. Participants also held beliefs about PA being a good way to make friends, something shared by 68% of the ASC group in Stanish et al.'s (2015) study. Healy et al. (2013) also commented on the negative aspects of peer interactions. Bullying was frequently reported by participants

and negative social comparisons apparently influenced participation. Importantly, the ratio of male to female participants in this study was 11:1. Research has identified several differences in the presentation of males and females with ASC, in particular with regard to social interactions (Mandy et al., 2012), and as such one might expect their views about PA to differ.

The idea of positive and negative peer relations in PA was corroborated by the second theme emerging from Blagrave's (2017) data. In her analysis, the 'influence of peers and family members' was viewed as positive in relation to families and friends acting as exercise partners and thus, increasing PA. Similar to Healy et al. (2013) though, negative aspects including bullying were also highlighted.

Like Blagrave (2017), Obrusnikova and Cavalier (2011), commented on the idea of exercise partners in their exploration of YP's views about barriers and facilitators to PA. They asked participants to take photos of things making it easier or harder to exercise after school. Participants then completed an online questionnaire about the photos and following this, a semi-structured interview. 42% of participants felt the lack of an exercise partner was a barrier to participation. By categorizing their coded data into concepts based on the socio-ecological model (McLeroy, Bibeau, Steckler, & Glanz, 1988), the frequency of these different categories of barriers and facilitators were reported. The most frequently cited of which, were intrapersonal (53%); those influenced by an individual's characteristics and how they respond to the environment and individuals around (Lloyd, Suggs, Blake, & Bardus, 2014). For example, engagement in technology-based activities or feeling tired. Interpersonal barriers, such as the lack of an exercise partner as discussed above, was the next most commonly cited (21%), while having friends, siblings or parents who are supportive or physically active was viewed as a significant facilitator.

Further discussion of the social aspects of PA came from Arnell et al. (2018), who explored how adolescents with ASC perceive, experience and reflect on their participation in PA, using semi-structured interviews. Their content analysis demonstrated how the social

demands of PA itself affected participation. The authors described how the expectation of social interaction during PA was likely to put YP off, particularly in unfamiliar circumstances. Difficulty adjusting to others was the most challenging aspect reported by participants but YP were also worried about spoiling the fun for others. This was also picked up by Lamb et al. (2016), with one participant stating, “I will um well disappoint people”.

Another important finding related to sensory experiences. Blagrave's (2017) final theme was of the ‘sensory experience or APE’, highlighting how APE made participants feel too hot, sweat too much and wish to be cooler. This was a common finding across papers, with Healy et al. (2013) also reporting their participants disliked getting sweaty, “I hate it when I get all hot and sweaty. When I get all hot my hair starts to itch uncontrollably”. Arnell et al. (2018) further corroborated this idea reporting on participants’ dislike for sweating and its influence in participation. Studies also drew attention to other sensory aspects such as noise. Healy et al. (2013) reported how sensory issues in response to auditory, tactile and heat sensitivity affected participation, for example participants found the noise in the sports hall unmanageable. In reporting on participants’ dislike for certain physical areas relating to PE, Lamb et al., (2016) discovered it was the noise level and crowdedness of these areas that felt particularly difficult for participants. The authors commented on how the space PE lessons are conducted in is important in relation to YP with ASC’s experience of safety and containment.

Blagrave (2017) however, commented on one participant’s positive sensory experience of exercise, finding it beneficial by providing sensory regulation as well as a break from other difficult sensory environments such as classrooms with bright lights.

Related to sensory sensitivities were participants’ experiences of the weather and how this impacted their participation. Importantly, these studies were conducted across a variety of countries, with some experiencing extremely hot summers or inclement weather conditions and as such the impact of the weather may be more or less relevant for some YP. Obrusnikova and Cavalier (2011), who conducted their research in Delaware, America, highlighted how 45% of

YP in their study reported stormy, rainy, cloudy or hot weather to impact participation. Stanish et al. (2015), also found participants in both the ASC and TD groups reported it was sometimes too hot or too cold outside to do sports and exercise (52% in each group) and 92% of these in the ASC group felt this would stop their participation. Blagrave's (2017) participants also commented on the weather, with one suggesting running laps in the sprinklers would be preferable. The author commented that, despite temperatures being relatively high, the research was conducted in the spring and before noon. This perhaps demonstrates the increased sensitivity of YP with ASC to weather conditions.

Some papers commented on YP's feelings of capability or confidence during PA. Arnell et al. (2018) reported how participants' perceptions of their own physical ability, competency in PA and self-confidence were important factors in participation. Their YP reflected PA required several different competencies, including motor skills, knowledge of the game and physical abilities. While some participants felt they were easily able to pick these up, others felt they did not meet the minimum standard required and thus were less likely to engage. Obrusnikova and Cavalier (2011) also reported on participants feeling they lacked the skills, coordination or balance to participate in the PA of their choice, for example wanting to skateboard but not feeling confident in having the skills to do so. Healy et al. (2013) reported participants felt they must be fit and able in order to succeed in PA, leading them to not participate as much as they might like and being excluded by peers for their inability, or by coaches who allowed them to sit out. Additionally, Stanish et al. (2015) found significantly more individuals in the ASC group reported sports were too hard to learn than the TD group (16% vs. 0%). As Arnell et al. (2018) discuss, sometimes a lack of confidence was related to this feeling of a lack of competence however, the lack of confidence also stretched beyond this, with the authors reporting low self-esteem relating to aspects such as their appearance, body or persona.

Arnell et al. (2018) extended the thinking regarding participation of YP with ASC by proposing a conditional model of participation. They described an overarching theme of "willing to participate, but it depends…", explaining how YP with ASC commonly reported their participation to depend on a specific concern. This finding was conceptualised as 'conditional participation'. The authors suggested even when most conditions are met, such as feeling competent and confident or having choice over the activity and enjoying it, the YP might still choose to abstain because of a previously un-thought of concern. The relevance of this model for YP with ASC was not discussed in comparison with TD YP by the authors. It is important to understand though, despite the conditional model perhaps being appropriate for all YP, it may be particularly well-suited to YP with ASC who often have additional needs, including ones that are not immediately obvious to others.

What are the experiences of parents of YP with ASC of their child participating in PA? Six papers explored parents' feelings towards their child engaging in PA either in PE at school or in community-based sports programmes. One of the most important issues emerging from these papers was the idea of inclusion versus exclusion. This was demonstrated by Gregor et al. (2018) who conducted interviews with ten parents of adolescents with ASC. Through a thematic analysis of the data, they depicted themes of the hidden labour of raising a YP with ASC, programme considerations, and systemic challenges of accessing PA programmes. Parents reported despite wanting to engage their child in PA, many community activities were not accessible, due to a lack of integrated or specialised programming for the needs of YP with ASC, and social and systemic barriers. Parents felt many programmes would not accept their child unless they had a support worker to aid them during sessions, and coaches and teachers were often unsure how to adapt coaching for the diversity of needs and abilities of YP with ASC. This idea was highlighted nicely by one parent, "Eli would love this, but they wouldn't take him because of his Autism and even when I offered to provide one-to-one support they didn't want to, they felt it was a liability".

This idea of systemic barriers was corroborated by Obrusnikova and Miccinello's (2012) study of parental perceptions of factors influencing participation. 103 parents of YP with ASC completed an online questionnaire and/or took part in a focus group exploring the perceived advantages and disadvantages of participation in PA and the barriers and facilitators to it. The authors reported almost a third of parents cited the lack of available community programmes or locations with developmentally appropriate or affordable PA opportunities to be a significant barrier to participation and their child's enjoyment of PA. Eight parents also observed staff members in their local community programmes did not have the experience or knowledge to accommodate their child with ASC, one parent stated, "I think most community programmes are unaware of the issues of the Autism spectrum…[they] tend to be volunteers who are not necessarily skilled or aware or educated to the issues that we face every day".

Parents in Ayvazoglu et al.'s (2015) study discussed the social exclusion faced in community programmes. Limited understanding of disability from some parents and social isolation were considered the main restrictions. In this mixed methods study, six families with a child with ASC participated in three phases of data collection. First, activity levels were monitored, then a q-sort task was completed and finally a semi-structured interview was administered based on responses from the q-sort task. Parents reported feeling excluded by other families, often feeling blamed for their child's difficult behaviour. They also commented on the poor understanding by coaches and instructors of ASC and thus, their child being excluded. One parent reflected how this had led to a wider feeling of exclusion from the local community, forcing them to rely on a small circle of support coming largely from other families with children with disabilities.

Contrastingly, parents in May et al.'s (2018) study praised the efforts of an adapted Auskick football programme. The authors utilised an existing programme teaching the basic movement and ball handling skills required for Australian Rules football, adapting it to accommodate the needs of YP with ASC. Following an 11-week programme, parents were

interviewed about their experiences of their child's participation. Thematic analysis of this data identified three themes: 'through the programme we had the opportunity to do something normal'; 'simple adaptations make the programme work for kids with ASC'; and 'there are barriers to team sport participation, but the benefits are worth it'. Unlike the previous studies, this adapted programme enabled parents to feel PA was accessible and successful for their child. Some of the adaptations reported as particularly helpful were the length of activities, the flexibility of the structure and a focus on repetition of a few basic skills rather than a wide range of content. They also commented on the use of visual instructions and social stories (Gray & Garand, 1993) and allowing for breaks for YP to unwind and release excess energy. Importantly, parents felt the coaches understood and could adapt coaching methods for individuals.

The idea of experience and knowledge of coaches in adapting PA programmes was also discussed by Lee et al. (2017) in their cross-sectional survey design study. Using the Parent Perceptions Toward Adapted Physical Education Teachers (PPTAPET) survey, they investigated the experiences of 41 parents of children with ASC on factors such as qualification to work with YP with ASC, parent-teacher rapport, and communication skills. Most parents either agreed or strongly agreed on items related to satisfaction of communication (56%), qualification (56%), and rapport (61%). The authors further explored the data by categorising the type of PE/APE session the YP was involved in, creating two groups: fully inclusive PE/APE sessions (always including peers without disabilities) or non-fully inclusive (sometimes or never including peers without disabilities). A significant difference was found between the reported satisfaction of parents in these groups, for example of communication ($p=.009$); qualification ($p=.017$) and rapport ($p=.011$), with parents whose child was educated in a non-fully inclusive environment being significantly more satisfied on these variables. The authors commented on this finding in relation to the recent increase in advocation for inclusive teaching environments. Based on their findings, they question whether inclusive PE classes

are what is best for YP with ASC. Parents in Obrusnikova and Miccinello's (2012) study also reported feeling the PE their child received was not wholly suitable as it did not accommodate their child's needs, feeling an adapted PE programme would be more appropriate.

Another finding from these papers was related to the significant barriers existing to participation. As well as the social and systemic barriers discussed above, parents in Obrusnikova and Miccinello's (2012) study reported on interpersonal, intrapersonal and physical barriers. While parents generally held positive beliefs about PA, difficulties with social and motor skills, attentional and behavioural difficulties, as well as narrow interests often relating to technology, were thought to reduce children's participation in PA. Similarly to YP's opinions in Obrusnikova and Cavalier's (2011) study, parents reported intrapersonal barriers to be the most significant. This included a preference for technology-based activities and a lack of motivation or interest in PA. This was in line with research conducted by Must et al. (2015), who outlined the differences in barriers to PA reported by parents of children with ASC and TD children. Three questionnaires were completed by parents, investigating perceived barriers to participation, type and frequency of PA, and screen time. A high level of social barriers were reported, for example difficulties with social skills, and a lack of expertise in coaches to include their child. Significantly more barriers were reported by the ASC group than the TD group, and the number of barriers to PA was significantly positively related to levels of screen time in children with ASC. What is unclear from these studies however, is whether a preference for technology-based activities leads to a decrease in participation in PA for YP with ASC, or whether the numerous barriers to participation for these YP leads them to seek other activity and thus, increases their screen-time.

Other papers commented on these barriers further. Ayvazoglu et al. (2015), for example, discussed parents' thoughts about time management, feeling they had to prioritise activities such as treatments and schoolwork over extra-curricular activities. Similarly, parents in Gregor et al.'s (2018) study felt the hidden labour involved in raising a child with ASC meant

their time was spent managing the household, going to treatment sessions or advocating in the community, all of which took precedence over PA. One parent described wanting to be able to involve their child more in PA but feeling unable due to stress and worry about paying for treatments. Notably, these studies were conducted in Canada and America, where treatment for healthcare is costly. It seems possible therefore, that YP with ASC in countries without a healthcare system to help cover these costs, may face more financial and practical barriers and thus have fewer opportunities to engage in extra-curricular PA.

Most parents felt PA benefited their child in several ways, reporting it to promote a range of skills from the development of new interests to developments in physical ability. Parents in May et al.'s (2018) study reported to have noticed improvements in motor skills and hand-eye coordination in their children. They also felt the programme had been a chance for their child to develop socially and emotionally, discussing how, although their children found it difficult to work in a team, doing so enabled them to see the benefits to working in groups. Parents also reported on their child's participation in what was considered a "normal" activity, and how this had allowed them to feel included with peers at school. Parents in Obrusnikova and Miccinello's (2012) study also reported many advantages to participation in PA for their child with ASC. The most common of these were physical, such as increased fitness and weight management, improved sleep and increased physical health. They also reported on psychosocial benefits, with PA increasing socialisation opportunities, and increasing factors such as confidence, self-esteem and general mental wellbeing. Some parents also felt PA participation had increased their child's social skills, decreased anxiety and frustration and taught them knowledge of sports rules and of the outside environment. Parents did also report some negative effects of PA however, relating to psychosocial factors such as increased negative affective reactions, bullying and teasing (similarly discussed by many YP), overstimulation, lack of success in motor skills and increased fatigue.

Summary of findings. Generally, the literature reviewed here suggests PA has a positive impact on YP with ASC. Both YP and parents discussed the social aspect of PA participation, with emphasis on its ability to enable friendships and social relationships and the negative impact of bullying and social comparisons. Several of the papers commented on barriers and facilitators to participation, with emphasis from some on the importance of children enjoying the PA (e.g. Obrusnikova & Miccinelo, 2012). Other important factors included YP feeling in control and the environment being suitable. Parents also commented on the use of rewards as a helpful tool in engagement. Both YP and parents however, discussed how intrapersonal factors such as YP's preference for screen-based activities might limit their participation in PA. Interpersonal barriers such as the lack of an exercise partner or community barriers such as having trained staff at community programmes were additionally reported by parents and/or YP.

Critique of the Literature

While these papers have provided a helpful overview of the perceptions of YP with ASC and parents of YP with ASC of participating in PA, it is important to provide a critique of these studies before drawing conclusions. An overview of the key critiques is presented in Table 4.

Measures and materials. Interviews were the most common methodology used in the reviewed papers. Some piloted interviews first to practice interviewing individuals with ASC (Arnell et al., 2018; Stanish et al., 2015) which may have helped in getting the most from participants. Other studies used more innovative methods such as the use of photovoice. This method seemed particularly appropriate for the ASC population as it is reported as giving YP a visual voice with which to express their experiences (Burke, 2009). As Lamb et al. (2016) discuss, this method was selected as the photos informed the interview, helping to stimulate dialogue between researcher and participant (Fitzgerald, Jobling, & Kirk, 2003) and interpretation of the images.

Some studies also used measures to assess levels of activity such as accelerometery (Ayvazoglu et al., 2015; Obrusnikova & Miccinello, 2012). This was somewhat useful in determining activity levels but has been criticised for inaccuracies and being influenced by the actual act of measuring activity. As such, it is considered most effective when combined with other data collection such as self-report and direct observations (Welk, Corbin, & Dale, 2000).

Further, some papers were unclear about the participants' ASC diagnosis. While some validated this with diagnostic tools such as the Autism Diagnostic Interview-Revised (ADI-R; Rutter, LeCouteur, & Lord, 2003), others used tools not developed for this purpose or made no comment. Without clarity over diagnosis, it is difficult to make generalisations about the findings of such studies.

Sampling biases. Many papers utilised opportunity or purposeful sampling designs, and some were limited in their breadth of sampling: selecting from a single institution or service (Arnell et al., 2018; Blagrave, 2017; Healy et al., 2013; May et al., 2018; & Obrusnikova & Cavalier, 2011). The sample frequently only included individuals who were participating in PA regularly, creating a positive bias towards engagement.

Gender was also often not considered appropriately. Despite many papers having a sample representing the population prevalence, the small number of females involved in studies may have led to misrepresentation of their views. Further, the age range was often rather broad. Younger children with ASC may have different views to older children, so it may have been more appropriate to narrow the inclusion criteria to avoid misrepresentation. In addition, all papers recruited predominantly Caucasian participants, with some failing to mention ethnicity entirely (Blagrave, 2017; Lamb et al., 2016; & May et al., 2018). Most studies also failed to report on socio-economic status and other important demographics. These sampling biases are important to consider when drawing conclusions from the data presented.

Design. Of the 12 papers, six were qualitative in nature, utilising semi-structured or structured interview techniques and innovative methods such as photography and drawing.

Two papers utilised a mixed methods approach, while three papers utilised a cross-sectional design and one used a case series approach. While qualitative designs allow for exploration of participants views and thus perhaps were an appropriate choice of design for many studies, the use of structured interviews or questionnaires with multiple choice answers may not have allowed for exploration of participants views as thoroughly.

Use of control group. Two papers utilised a control group (Must et al., 2015 & Stanish et al., 2015), which was found to be somewhat helpful in comparing individuals with ASC and TD individuals' experiences. It is questionable however, how much these control groups added to the understanding of experiences of YP with ASC, or parents' views in relation to PA as they did not investigate the differences and similarities between the groups further by exploring what YP thought of this.

Analysis. Many of the reviewed papers utilised qualitative analysis methods. This included thematic and content analysis as well as a coding technique described by Hruschka et al. (2004). While most of these studies outlined their coding procedure well, describing different levels of coding as well as whether transcripts were co-rated, there was a general lack of reflexivity within the studies, with most authors failing to describe clearly their position and role within the work. An exception to this was Gregor et al. (2018), who reported on several measures taken to ensure procedural and analytical rigour. The research teams' background was considered, data was generated concurrently with analysis and transcripts were reviewed for accuracy. In contrast, Lamb et al. (2016), were very brief in their description of analysis making it more difficult to assess the validity of their findings. In general, the qualitative analysis performed by all studies appeared appropriate, however, reporting on the analysis procedure was lacking in some papers.

The remaining three studies reported the use of quantitative methods which were generally appropriate for the data collected. Only Must et al. (2016) however, reported on the normality of their data and how this informed their use of parametric or non-parametric

methods. They were also the only authors to comment on adjustment for multiple comparisons. Lee et al.'s (2017) reporting of analysis procedure and results was very brief and thus made it difficult to determine the validity of their conclusions. Further, no papers commented on any power calculations, thus the appropriateness of their sample size for detecting significance was unclear.

Ethical considerations. The only paper to comment on ethical considerations aside from having gained ethical approval, was Healy et al. (2013). They described the adaptations made to information sheets to ensure participants with ASC fully understood what they were consenting to. They also checked participants understanding of what would be spoken about and why before beginning interviews. This was missing from other studies. This is important as involving YP with ASC in research of this kind is vital, however must be done sensitively and in line with ethical procedures.

Table 4.
Key Critiques Based on Quality Assurance Tools

Paper (Quality assurance tool)	Key Strengths	Key weaknesses
Arnell et al. (2018) (JBI qualitative)	✓ Age appropriate versions of information sheets ✓ Pilot interviews to test questions and practice interviewing individuals with ASC ✓ Researchers from various professional backgrounds: reduced risk of biased ubinterpretation of results	× No consideration of ethnicity or culture × Limited to individuals with high-functioning Autism (HFA) who could take part in interview × Gender imbalance
Ayvazoglu et al. (2015) (MMAT)	✓ Multiple triangulation approaches used: of methods and of analysts ✓ Good explanation of theoretical grounding	× Included only HFA × Family systems approach but interviewed mothers only × Mostly white British × Conclusions based on only 6 cases × No diagnostic information

Blagrave (2017) (JBI qualitative)	✓ Triangulation of data collection ✓ Innovative methodology ✓ Clarified diagnosis by professionals and parents	× Time-period of data collection very brief × Some questions were vague. × Methodology required narrative retell abilities
Gregor et al. (2018) (JBI qualitative)	✓ Good procedural and analytical rigour ✓ Appropriate participant number for exploratory study	× Participants from single Canadian metropolitan area
Healy et al. (2013) (JBI qualitative)	✓ Interview strategy developed with individuals who had experience with ASC ✓ Bracketing carried out to reduce impact of bias ✓ Reported on ethical considerations	× Ratio of male to female = 11:1 × Participants all attended mainstream education – only captures views of HFA group × Sampling strategy limiting
Lamb et al. (2016) (JBI case study)	✓ ASC diagnosis confirmed ✓ Innovative methodology ✓ Good theoretical underpinning	× Participants had comorbidities × Very small number of participants × No discussion of limitations
Lee et al. (2017) (JBI cross-sectional)	✓ Reported on psychometrics of questionnaire used ✓ Broad age-range used	× Inclusion/Exclusion criteria not clearly defined × Predominantly Caucasian participants
May et al. (2018) (JBI qualitative)	✓ Verified diagnosis of ASC ✓ Good description of programme being evaluated	× Interviews were very short (6 questions) × All male participants × Small participant number
Must et al. (2015) (JBI cross-sectional)	✓ Verified ASC diagnosis ✓ Variety of recruitment methods ✓ Appropriate control group used ✓ Statistical analysis appropriate	× Sample was all white British and well educated × Relied on self-report measures
Obrusnikova & Cavalier (2011) (JBI qualitative)	✓ Verified ASC diagnosis ✓ Inter-rater reliability was good ✓ Innovative methodology used	× Sample were all average cognitive ability × No comment on parental influence × No external measure of facilitators and barriers

Obrusnikova & Miccinello (2012) (MMAT)	✓ Large sample size ✓ Verified diagnosis of ASC ✓ Used two data sources	× No external measure of facilitators and barriers – not objective × Participants predominantly Caucasian
Stanish et al. (2015) (JBI cross-sectional)	✓ Verified ASC diagnosis ✓ Pilot tested interviews (albeit not on individuals with ASC)	× Small unrepresentative sample × Gender balance uneven in ASC group but not in TD group

Discussion

This review aimed to explore the experiences of YP with ASC and parents of YP with ASC regarding participation in PA. The included papers were of varying quality as is highlighted by Table 4. Quality assurance checklists formed the basis of the critique alongside more general consideration of methodological rigour. While the quality was variable, all papers included in this review were published in peer reviewed journals and were deemed to meet an appropriate standard. The most common concern regarded small and often un-diverse sample sizes. While these are important issues to consider, it must be emphasised research in this field is in its infancy and many of these studies are the first of their kind.

The view from YP across these papers was generally positive regarding PA, often being described as enjoyable, fun and worthwhile. This included reports that PA enabled friendships, provided opportunities for success, improved motor skills and for some, provided positive sensory experiences. YP in these papers however, also reported negative aspects of PA, for example, experiencing bullying and teasing, sensory sensitivities to the PA environment including uncomfortable levels of noise or physical discomfort such as overheating, and a lack of confidence in their own abilities. Some of the studies explored barriers to participation and these were found to fit well with some aspects of Eime et al.'s (2013) model. For example, intrapersonal barriers were the most frequently cited by YP, including a preference for technology-based activities but YP also reported interpersonal barriers such as the lack of an

exercise partner and physical barriers including inclement weather conditions. Despite these barriers and negative experiences, many YP in the studies felt positively about PA and wished to participate more frequently. More in depth study of the social, environmental and policy barriers might have been helpful in order to better understand the PA patterns of YP with ASC. Additionally, some recognition of the positive bias perhaps created by the selection of participants already engaging in PA may have provided a more comprehensive and generalisable understanding of participation.

In order to understand levels of activity and experiences of PA further, studies exploring the perceptions of parents of YP with ASC were also reviewed. While there were some similarities in what parents and YP reported, there were several aspects parents alone described. One important similarity was parents felt their child's interest in technology-based activities and the lack of an exercise partner contributed to their low levels of engagement in PA. They also spoke of financial and practical barriers such as the cost of treatments and other hidden aspects involved in raising a child with ASC. Many of these studies however, did not consider culture or socio-economic status within their work and were often conducted in a single geographical location, thus conclusions about aspects such as costs of treatment and its impact on PA participation must be interpreted with caution. Parents also reported feeling their child was excluded from participation by community or school programmes that weren't equipped or willing to provide the support required. Interestingly, parents themselves also seemed to exclude their child from community programmes, due to feeling coaches were not qualified enough. This idea of social exclusion was felt by parents across several papers. While these conclusions were drawn from papers where sample sizes were particularly low, there was a helpful consideration within them of barriers from a range of levels, which in some respects overlapped with those outlined by the HTS model (Eime et al., 2013).

Despite there being no consensus about what type of PA programme might be best, a dissatisfaction with the current integrated programmes and some satisfaction with those

catering specifically for YP with ASC, raised questions about what type of PA session is best. Many parents did however, feel their child benefitted from engaging in PA in several ways, from developing their motor and coordination skills to improving social skills and communication. Several parents across the studies wished they could help their child to participate more frequently and that things such as accessible and supportive sports programmes, having a structure and routine, and enabling YP to have choice around PA helped them to participate.

Limitations of this Review

This review attempted to bring together research from a relatively new and innovative field and thus provides an important overview of research in this area. The limitations of this work however, are important to note. Firstly, the concept of PA is a broad one and could possibly include a range of activities. It may be that in attempting to be concise and accurate, some papers were lost that may have commented on PA within other leisure activities. Secondly, many papers did not refer to other disabilities within its sample. This may have skewed the results since the sample may not have consisted of individuals with a sole diagnosis of ASC.

Clinical Implications

When considering PA for YP with ASC, this review has highlighted the importance of several factors in relation to making sessions enjoyable, practical and accessible. The literature has demonstrated YP and parents feel PA is generally positive with regards to social, physical and psychological wellbeing. This fits with Eime et al.'s (2013) model which, proposes these factors as important outcomes of participation in sport. While these were discussed by YP and their parents as isolated factors, the authors of some papers discussed the idea that they may interact. Lamb et al. (2016) for example, commented on how physical achievements in sport may promote social capital and a sense of mastery for YP with ASC. This in turn may promote

psychological benefits, as Obrusnikova and Miccinello (2012) discussed, such as increased confidence and self-esteem. Considering this, it is important to reflect on where PA fits within support services for YP with ASC. If opportunities can be provided for YP to gain confidence in their own abilities and learn transferable skills, there may be scope for PA interventions to become a standard part of care plans. It is perhaps the role of clinical psychologists to begin to think outside of the therapy room and to help encourage community-based interventions in promoting psychological wellbeing through sport.

As highlighted by this review, particularly by parents, it is important for professionals to consider carefully the level of inclusivity of PA programmes. While in many areas, inclusion for YP with disabilities is being promoted, it may be that within the PA environment, YP with ASC require a feeling of safety and containment that might be more likely to come from sessions specifically catering to the difficulties associated with ASC. This is particularly important considering some of the reports from YP within these studies of bullying and teasing. This can be related to the concentric circles in Eime et al's (2013) model, reminding us of the importance of paying attention not only to the individual barriers and facilitators, but interpersonal, social and policy level factors also. Engendering a safe and containing environment to practice skills and take risks in participating in new activities therefore is vital in order for YP to gain confidence in their own abilities.

Research Implications

Further research is still needed in thinking about what interventions work best, how coaches can adapt their practice to suit individuals with ASC and how clubs, professionals and communities can reduce the number of barriers facing these YP. The papers reviewed here have demonstrated a desire for PA among YP with ASC and thus provides weight to the argument for increasing research in this field.

An important consideration for future research would be to ensure the diversity of individuals with ASC is represented. Many papers focussed on YP with ASC with average intellectual abilities. It is vital to consider the views of those who may have a comorbid ID who are often excluded from participating in research resulting in their experiences remaining unheard. Additionally, it would be important to consider how YP with ASC identify with gender and how this impacts their experiences of PA, as research has indicated that difficulties associated with ASC may differ considerably between genders and thus may influence how PA is perceived. Considering the lack of attention to diversity within the studies reviewed here, it would also be helpful for future research to attend to participant demographics in relation to culture and ethnicity, recruiting a more diverse sample and to consider this alongside models such as Eime et al (2013) to help influence change at all levels. Research with much larger sample sizes may also be of benefit, as most of the reviewed studies included a very small number of participants, making generalisations to the wider population difficult. Research focussing on the outcomes and potential benefits of PA, such as those hypothesised in Eime at al.'s (2013) model is also important.

Conclusion

This review aimed to explore the experiences of PA by YP with ASC and parents of YP with ASC. This question was important since research has indicated levels of PA in YP with ASC are significantly below recommended guidelines. PA has shown to promote good physical and mental wellbeing in the TD population (Penedo & Dahn, 2005), and thus may also prove effective in promoting wellbeing in individuals with ASC. By bringing together this body of literature, this review has helped provide a stronger narrative about what YP with ASC enjoy about PA and aspects of it they find challenging or negative. Reviewing the perspectives of their parents has also given consideration to the difficulties families face in

attempting to encourage participation. Having this data may help clinicians and service providers ensure sports provision is made accessible and appealing to YP with ASC.

Reference List

Allison, D. B., Basile, V. C., & MacDonald, R. B. (1991). Brief report: Comparative effects of antecedent exercise and lorazepam on the aggressive behavior of an autistic man. *Journal of Autism and Developmental Disorders*, *21*, 89–94. https://doi.org/10.1007/BF02207001

American Psychiatric Association. (2013). Diagnostic and Statistical Manual of Mental Disorders (Fifth Edition). https://doi.org/10.1176/appi.books.9780890425596

Arnell, S., Jerlinder, K., & Lundqvist, L.-O. (2018). Perceptions of Physical Activity Participation Among Adolescents with Autism Spectrum Disorders: A Conceptual Model of Conditional Participation. *Journal of Autism and Developmental Disorders, 48,* 1792–1802. https://doi.org/10.1007/s10803-017-3436-2

Ayvazoglu, N. R., Kozub, F. M., Butera, G., & Murray, M. J. (2015). Determinants and challenges in physical activity participation in families with children with high functioning autism spectrum disorders from a family systems perspective. *Research in Developmental Disabilities, 47,* 93–105. ttps://doi.org/10.1016/j.ridd.2015.08.015

Ajzen, I. (1985). From Intentions to Actions: A Theory of Planned Behavior. In J. Kuhl & J. Beckmann (Eds.), Action Control: From Cognition to Behavior (pp. 11–39). https://doi.org/10.1007/978-3-642-69746-3_2

Bass, M. M., Duchowny, C. A., & Llabre, M. M. (2009). The effect of therapeutic horseback riding on social functioning in children with Autism. *Journal of Autism and Developmental Disorders, 39,* 1261–1267. https://doi.org/10.1007/s10803-009-0734-3

Beaton, A. A., Funk, D. C., & Alexandris, K. (2009). operationalizing a theory of participation in physically active leisure. *Journal of Leisure Research, 41,* 175–203. https://doi.org/10.1080/00222216.2009.11950165

Biddle, S. J. H., & Asare, M. (2011). Physical activity and mental health in children and adolescents: A review of reviews. *British Journal of Sports Medicine, 45,* 886–895. https://doi.org/10.1136/bjsports-2011-090185

Blagrave, J. (2017). Experiences of children with autism spectrum disorders in adapted physical education. *European Journal of Adapted Physical Activity, 10,* 17–27.

Brand, S., Colledge, F., Ludyga, S., Emmenegger, R., Kalak, N., Sadeghi Bahmani, D., … Gerber, M. (2018). Acute bouts of exercising improved mood, rumination and social interaction in inpatients with mental disorders. *Frontiers in Psychology, 9.* https://doi.org/10.3389/fpsyg.2018.00249

Brugha, T., Cooper, S. A., McManus, S., Purdon, S., Smith, J., Scott, F. J., Spiers, N., & Tyrer, F. (2012). Estimating the prevalence of autism in adults: Extending the 2007 Adult Psychiatric Morbidity Survey. *The NHS Information Centre.* Retrieved from: https://files.digital.nhs.uk/publicationimport/pub05xxx/pub05061/esti-prev-auti-ext-07-psyc-morb-surv-rep.pdf

Burke, C. (2009). 'Play in focus': Children's visual voice in participative research. In: Thomson P (ed.). Doing Visual Research with Children and Young People. London and New York: Routledge, 23–36.

Curtin, C., Jojic, M., & Bandini, L. G. (2014). Obesity in children with autism spectrum disorder. *Harvard Review of Psychiatry, 22,* 93–103. https://doi.org/10.1097/HRP.0000000000000031

Department of Health, Physical Activity, Health Improvement and Protection. (2011). *Start Active, Stay Active: A report on physical activity from the four home countries' Chief Medical Officers.* Retrieved from: https://www.gov.uk/government/publications/start-active-stay-active-a-report-on-physical-activity-from-the-four-home-countries-chief-medical-officers

Dziuk, M. A., Larson, J. C. G., Apostu, A., Mahone, E. M., Denckla, M. B., & Mostofsky, S. H. (2007). Dyspraxia in autism: Association with motor, social, and communicative deficits. *Developmental Medicine & Child Neurology*, *49*, 734–739. https://doi.org/10.1111/j.1469-8749.2007.00734.x

Eaves, L. C., & Ho, H. H. (2008). Young adult outcome of autism spectrum disorders. *Journal of Autism and Developmental Disorders*, *38*, 739–747. https://doi.org/10.1007/s10803-007-0441-x

Egilson, S. T., Jakobsdottir, G., Olafsson, K., & Leosdottir, T. (2017). Community participation and environment of children with and without autism spectrum disorder: Parent perspectives. *Scandinavian Journal of Occupational Therapy*, *24*, 187–196. https://doi.org/10.1080/11038128.2016.1198419

Eime, R. M., Young, J. A., Harvey, J. T., Charity, M. J., & Payne, W. R. (2013). A systematic review of the psychological and social benefits of participation in sport for children and adolescents: Informing development of a conceptual model of health through sport. *International Journal of Behavioral Nutrition and Physical Activity*, *10*, 98. https://doi.org/10.1186/1479-5868-10-98

Elliott, R. O., Dobbin, A. R., Rose, G. D., & Soper, H. V. (1994). Vigorous, aerobic exercise versus general motor training activities: Effects on maladaptive and stereotypic behaviors of adults with both autism and mental retardation. *Journal of Autism and Developmental Disorders*, *24*, 565–576. https://doi.org/10.1007/BF02172138

Fedewa, A. L., & Ahn, S. (2011). The Effects of Physical Activity and Physical Fitness on Children's Achievement and Cognitive Outcomes. *Research Quarterly for Exercise and Sport*, *82*, 521–535. https://doi.org/10.1080/02701367.2011.10599785

Fitzgerald, H., Jobling, A., & Kirk, D. (2003). Valuing the Voices of Young Disabled People: Exploring Experience of Physical Education and Sport. *European Journal of Physical Education*, *8*, 175–200. https://doi.org/10.1080/1740898030080206

Funk, D., & James, J. (2001). The psychological continuum model: A conceptual framework for understanding an individual's psychological connection to sport. *Sport Management Review, 4*, 119-150. https://doi.org/10.1016/S1441-3523(01)70072-1

Gray, C. A., & Garand, J. D. (1993). Social Stories: Improving Responses of Students with Autism with Accurate Social Information. Focus on Autistic Behavior, 8(1), 1–10. https://doi.org/10.1177/108835769300800101

Gregor, S., Bruni, N., Grkinic, P., Schwartz, L., McDonald, A., Thille, P., … Jachyra, P. (2018). Parents' perspectives of physical activity participation among Canadian adolescents with Autism Spectrum Disorder. *Research in Autism Spectrum Disorders, 48,* 53–62. https://doi.org/10.1016/j.rasd.2018.01.007

Hameury, L., Delavous, P., Teste, B., Leroy, C., Gaboriau, J.-C., & Berthier, A. (2010). Équithérapie et autisme. *Annales Médico-Psychologiques, Revue Psychiatrique, 168*, 655–659. https://doi.org/10.1016/j.amp.2009.12.019

Healy, S., Msetfi, R., & Gallagher, S. (2013). 'Happy and a bit Nervous': The experiences of children with autism in physical education. *British Journal of Learning Disabilities, 41*, 222–228. https://doi.org/10.1111/bld.12053

Hilton, C. L., Crouch, M. C., & Israel, H. (2008). Out-of-school participation patterns in children with high-functioning autism spectrum disorders. *The American Journal of Occupational Therapy: Official Publication of the American Occupational Therapy Association, 62*, 554–563.

Hong, Q. N., Gonzalez-Reyes, A., & Pluye, P. (2018). Improving the usefulness of a tool for appraising the quality of qualitative, quantitative and mixed methods studies, the Mixed Methods Appraisal Tool (MMAT). *Journal of Evaluation in Clinical Practice, 24*, 459–467. https://doi.org/10.1111/jep.12884

Hruschka, D. J., Schwartz, D., St.John, D. C., Picone-Decaro, E., Jenkins, R. A., & Carey, J. W. (2004). Reliability in Coding Open-Ended Data: Lessons Learned from HIV

Behavioral Research. *Field Methods, 16*, 307–331. https://doi.org/10.1177/1525822X04266540

Jansiewicz, E. M., Goldberg, M. C., Newschaffer, C. J., Denckla, M. B., Landa, R., & Mostofsky, S. H. (2006). Motor Signs Distinguish Children with High Functioning Autism and Asperger's Syndrome from Controls. *Journal of Autism and Developmental Disorders, 36*, 613–621. https://doi.org/10.1007/s10803-006-0109-y

Lamb, P., Firbank, D., & Aldous, D. (2016). Capturing the world of physical education through the eyes of children with autism spectrum disorders. *Sport Education and Society, 21*, 698–722. https://doi.org/10.1080/13573322.2014.941794

Lang, R., Koegel, L. K., Ashbaugh, K., Regester, A., Ence, W., & Smith, W. (2010). Physical exercise and individuals with autism spectrum disorders: A systematic review. *Research in Autism Spectrum Disorders, 4*, 565–576. https://doi.org/10.1016/j.rasd.2010.01.006

Lee, J., Haegele, J. A., & Chang, S. H. (2017). Satisfaction of Parents of Children With Autism Spectrum Disorder Toward Physical Education Teachers. *Physical Educator-Us, 74*, 715–729. https://doi.org/10.18666/TPE-2017-V74-I4-7245

Llewellyn, A., & Hogan, K. (2000). The Use and Abuse of Models of Disability. *Disability & Society, 15*, 157–165. https://doi.org/10.1080/09687590025829

Lloyd, S., Suzanne Suggs, L., Blake, H., & Bardus, M. (2014). Reasons for participating and not participating in a e-health workplace physical activity intervention: A qualitative analysis. *International Journal of Workplace Health Management, 7*, 229–246. https://doi.org/10.1108/IJWHM-11-2013-0040

May, T., Rinehart, N., Barnett, L., Hinkley, T., McGillivray, J., Skouteris, H., … Goldfinch, D. (2018). 'We're Doing AFL Auskick as Well': Experiences of an adapted football program for children with Autism. *Journal of Motor Learning & Development, 6*, 130–146. https://doi.org/ 10.1123/jmld.2016-0055

McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An Ecological Perspective on Health Promotion Programs. *Health Education Quarterly, 15*, 351–377. https://doi.org/10.1177/109019818801500401

Mehtälä, M. A. K., Sääkslahti, A. K., Inkinen, M. E., & Poskiparta, M. E. H. (2014). A socio-ecological approach to physical activity interventions in childcare: A systematic review. *International Journal of Behavioral Nutrition and Physical Activity, 11*, 22. https://doi.org/10.1186/1479-5868-11-22

Minshew, N. J., Sung, K., Jones, B. L., & Furman, J. M. (2004). Underdevelopment of the postural control system in autism. *Neurology, 63*, 2056–2061.

Moher, D., Liberati, A., Tetzlaff, J., Altman, D. G., & Group, T. P. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA Statement. *PLOS Medicine, 6*, e1000097. https://doi.org/10.1371/journal.pmed.1000097

Must, A., Phillips, S., Curtin, C., & Bandini, L. G. (2015). Barriers to Physical Activity in Children With Autism Spectrum Disorders: Relationship to Physical Activity and Screen Time. *Journal of Physical Activity & Health, 12*, 529–534. https://doi.org/10.1123/jpah.2013-0271

Myers, S. M., Johnson, C. P., & American Academy of Pediatrics Council on Children With Disabilities. (2007). Management of children with autism spectrum disorders. *Pediatrics, 120*, 1162–1182. https://doi.org/10.1542/peds.2007-2362

National Institute for Health and Care Excellence. (2009). Depression in adults: Recognition and management. *NICE.* Retrieved from: https://www.nice.org.uk/guidance/cg90.

Obrusnikova, I., & Cavalier, A. R. (2011). Perceived Barriers and Facilitators of Participation in After-School Physical Activity by Children with Autism Spectrum Disorders. *Journal of Developmental and Physical Disabilities, 23*, 195–211. https://doi.org/10.1007/s10882-010-9215-z

Obrusnikova, I., & Miccinello, D. L. (2012). Parent Perceptions of Factors Influencing After-School Physical Activity of Children With Autism Spectrum Disorders. *Adapted Physical Activity Quarterly*, *29*, 63–80. https://doi.org/10.1123/apaq.29.1.63

Pan, C. Y. (2008). Objectively Measured Physical Activity Between Children With Autism Spectrum Disorders and Children Without Disabilities During Inclusive Recess Settings in Taiwan. *Journal of Autism and Developmental Disorders, 38*, 1292. https://doi.org/10.1007/s10803-007-0518-6

Pan, C.-Y. (2010). Effects of water exercise swimming program on aquatic skills and social behaviors in children with autism spectrum disorders. *Autism*, *14*, 9–28. https://doi.org/10.1177/1362361309339496

Pan, C.-Y., & Frey, G. C. (2006). Physical Activity Patterns in Youth with Autism Spectrum Disorders. *Journal of Autism and Developmental Disorders, 36*, 597. https://doi.org/10.1007/s10803-006-0101-6

Pitetti, K. H., Rendoff, A. D., Grover, T., & Beets, M. W. (2007). The efficacy of a 9-month treadmill walking program on the exercise capacity and weight reduction for adolescents with severe autism. *Journal of Autism and Developmental Disorders*, *37*, 997–1006. https://doi.org/10.1007/s10803-006-0238-3

Rowe, K., Shilbury, D., Ferkins, L., & Hinckson, E. (2013). Sport development and physical activity promotion: An integrated model to enhance collaboration and understanding. *Sport Management Review, 16*, 364–377. https://doi.org/10.1016/j.smr.2012.12.003

Rutter, M., Le Couteur, A.,& Lord, C. (2003). *Autism diagnostic interview-revised*. Los Angeles, CA: Western Psychological Services.

Simonoff, E., Pickles, A., Charman, T., Chandler, S., Loucas, T., & Baird, G. (2008). Psychiatric disorders in children with autism spectrum disorders: Prevalence, comorbidity, and associated factors in a population-derived sample. *Journal of the*

American Academy of Child and Adolescent Psychiatry, 47, 921–929. https://doi.org/10.1097/CHI.0b013e318179964f

Sport England. (2012). *Places People Play.* Retrieved from: https://www.sportengland.org/

Sport England. (2018). Active Lives Survey, 2015-2016. Retrieved from http://doi.org/10.5255/UKDA-SN-8223-2

Srinivasan, S. M., Pescatello, L. S., & Bhat, A. N. (2014). Current perspectives on physical activity and exercise recommendations for children and adolescents with Autism Spectrum Disorders. *Physical Therapy, 94*, 875–889. https://doi.org/10.2522/ptj.20130157

Stanish, H., Curtin, C., Must, A., Phillips, S., Maslin, M., & Bandini, L. (2015). Enjoyment, barriers, and beliefs about physical activity in adolescents with and without Autism Spectrum Disorder. *Adapted Physical Activity Quarterly, 32*, 302–317. https://doi.org/10.1123/APAQ.2015-0038

Stathopoulou, G., Powers, M. B., Berry, A. C., Smits, J. A. J., & Otto, M. W. (2006). Exercise Interventions for Mental Health: A Quantitative and Qualitative Review. Clinical Psychology: *Science and Practice*, *13*, 179–193. https://doi.org/10.1111/j.1468-2850.2006.00021.x

Steinberg, H., Sykes, E. A., Moss, T., Lowery, S., LeBoutillier, N., & Dewey, A. (1997). Exercise enhances creativity independently of mood. *British Journal of Sports Medicine, 31*, 240–245.

Stokols, D. (1996). Translating Social Ecological Theory into Guidelines for Community Health Promotion. *American Journal of Health Promotion, 10*, 282–298. https://doi.org/10.4278/0890-1171-10.4.282

Strauss, R. S., Rodzilsky, D., Burack, G., & Colin, M. (2001). Psychosocial correlates of physical activity in healthy children. *Archives of Pediatrics & Adolescent Medicine, 155*, 897–902.

Strong, W. B., Malina, R. M., Blimkie, C. J. R., Daniels, S. R., Dishman, R. K., Gutin, B., … Trudeau, F. (2005). Evidence based physical activity for school-age youth. *The Journal of Pediatrics, 146*, 732–737. https://doi.org/10.1016/j.jpeds.2005.01.055

Tan, W. Z. B. (2011). Physical activity: Its implication on attention span and quality of life in children with autism spectrum disorder. Theses : Honours. Retrieved from https://ro.ecu.edu.au/theses_hons/20

Taylor, J. L., McPheeters, M. L., Sathe, N. A., Dove, D., Veenstra-VanderWeele, J., & Warren, Z. (2012). A systematic review of vocational interventions for young adults with Autism Spectrum Disorders. *Pediatrics, 130*, 531–538. https://doi.org/10.1542/peds.2012-0682

Telama, R., Yang, X., Leskinen, E., Kankaanpää, A., Hirvensalo, M., Tammelin, T., … Raitakari, O. T. (2014). Tracking of physical activity from early childhood through youth into adulthood. *Medicine and Science in Sports and Exercise, 46*, 955–962. https://doi.org/10.1249/MSS.0000000000000181

Thornton, G. (2012). Report 5: Post-games evaluation. Meta-evaluation of the impacts and legacy of the London 2012 Olympic games and Paralympic games. *Department for Digital, Culture, Media & Sport*. Retrieved from: https://www.gov.uk/government/publications/report-5-post-games-evaluation-meta-evaluation-of-the-impacts-and-legacy-of-the-london-2012-olympic-and-paralympic-games

Townsend, R. C., Smith, B., & Cushion, C. J. (2015). Disability sports coaching: Towards a critical understanding. *Sports Coaching Review, 4*, 80–98. https://doi.org/10.1080/21640629.2016.1157324

Tsang, H. W. H., Chan, E. P., & Cheung, W. M. (2008). Effects of mindful and non-mindful exercises on people with depression: A systematic review. *The British Journal of Clinical Psychology, 47*, 303–322. https://doi.org/10.1348/014466508X279260

Welk, G. J., Corbin, C. B., & Dale, D. (2000). Measurement issues in the assessment of physical activity in children. *Research Quarterly for Exercise and Sport, 71,* S59-73.

Yilmaz, I., Yanardağ, M., Birkan, B., & Bumin, G. (2004). Effects of swimming training on physical fitness and water orientation in autism. *Pediatrics International, 46,* 624–626. https://doi.org/10.1111/j.1442-200x.2004.01938.x

Section B

"It's all about knowing the young person": Best practice in coaching athletes with Autism Spectrum Condition (ASC)

Word Count: 7929 (677)

ALEXANDRA FRANCES KIMBER (HILES)

APRIL 2019

A thesis submitted in partial fulfilment of the requirements of Canterbury Christ Church University for the degree of Doctor of Clinical Psychology

SALOMONS CENTRE FOR APPLIED PSYCHOLOGY
CANTERBURY CHRIST CHURCH UNIVERSITY

Abstract

Background

Young People (YP) with Autism Spectrum Condition (ASC) are often excluded from participating in physical activity (PA). Insufficient literature exists exploring this issue. The present study therefore aimed to explore the experiences of individuals coaching YP with ASC, to determine what works well in engaging and motivating YP with ASC in sport, and what the challenges are in doing so.

Methods

Ten semi-structured interviews were conducted with coaches of YP with ASC. Data were transcribed and subjected to thematic analysis. Validation interviews were conducted with two YP with ASC to further explore this matter.

Results

Five key themes were identified. These were: the coach-athlete relationship, coaching strategies, benefits of participation, behaviour management, and ASC and PA. Data from validation interviews demonstrated some similarities with coach's opinions but also some differences.

Discussion

The findings suggested the coach-athlete relationship is vital in engaging and motivating YP with ASC to participate. Importantly, the diversity of YP with ASC was recognised, outlining the need for a person-centred approach to coaching. Some general strategies were discussed as helpful, particularly relating to structure and communication. Clinical and research implications are discussed.

Keywords: Autism, Coaching, Sport, Young People

Introduction

The benefit of physical activity (PA) on physical and mental health in neurotypical populations is well documented. Participation in PA has shown to protect against physical health conditions such as obesity, chronic heart disease and diabetes (Warburton, Nicol, & Bredin, 2006) and mental health conditions such as depression and anxiety (Eime, Young, Harvey, Charity, & Payne, 2013; Paluska & Schwenk, 2000). Research has also indicated a positive impact on other aspects of functioning such as motor skills (Favazza et al., 2013), social skills (Howie, Lukacs, Pastor, Reuben, & Mendola, 2010) and self-esteem (Ekeland, Heian, Hagen, & Coren, 2005).

Participation in PA

Despite the benefits of PA, participation levels vary greatly across generations, gender and ability level. Individuals with a disability are far less likely to engage in PA than those without a disability, with 51% of those with three or more impairments classified as inactive, compared with 21% of those with no impairments (Sport England, 2018). One population recently highlighted as being significantly less active are young people (YP) with Autism Spectrum Condition (ASC; Pan, 2008; Srinivasan, Pescatello, & Bhat, 2014).

ASC. ASC is a neurodevelopmental condition characterised by a dyad of impairments, with difficulties in social communication/social interaction, and restricted/repetitive patterns of behaviour, interests or activities and sensory sensitivities (American Psychiatric Association [APA], 2013). Alongside these core diagnostic features, many individuals with ASC find everyday activities more challenging (Eaves & Ho, 2008) and are at greater risk of comorbid physical health conditions (Curtin, Jojic, & Bandini, 2014), mental health conditions (Simonoff et al., 2008), and motor skills deficits (Dziuk et al., 2007).

Models of Disability

The different models of disability and the implications they have for understanding participation in and benefits of PA are important to consider. While the medical model has historically been the most dominant framework for understanding disability (Townsend, Smith, & Cushion, 2016), its focus on individual impairment as disabling means the role of societal and environmental barriers in exclusion and discrimination are ignored. Elite disability sport demonstrates a close alignment with the medical model, whereby disability is reduced to biological mechanisms and processes that are sought to be overcome by strategies and interventions for disabled athletes to enhance performance. This implies the key barriers to participation are to do with the limitations their impairment poses rather than broader systems level factors.

A preferred understanding of disability in relation to PA comes from the social model of disability (Llewellyn & Hogan, 2000). This positions individual impairment as separate from disability, instead understanding how societal and environmental discourses and factors act to disable those with differences. Thus, individuals with impairments are believed unable to participate in PA not due to the restrictions of their impairment, but due to factors within the context and environment of sports clubs (Townsend et al., 2016). These ideas are increasingly being used to understand participation in PA, whereby intrapersonal, interpersonal, organisational, environmental and policy variable are considered to influence engagement (e.g. Casey, Eime, Payne, & Harvey, 2009). One recent model of participation in PA using this framework is the Health through Sport (HTS) model (Eime et al.. 2013), which considers a range of factors influencing participation, engagement and outcome of PA.

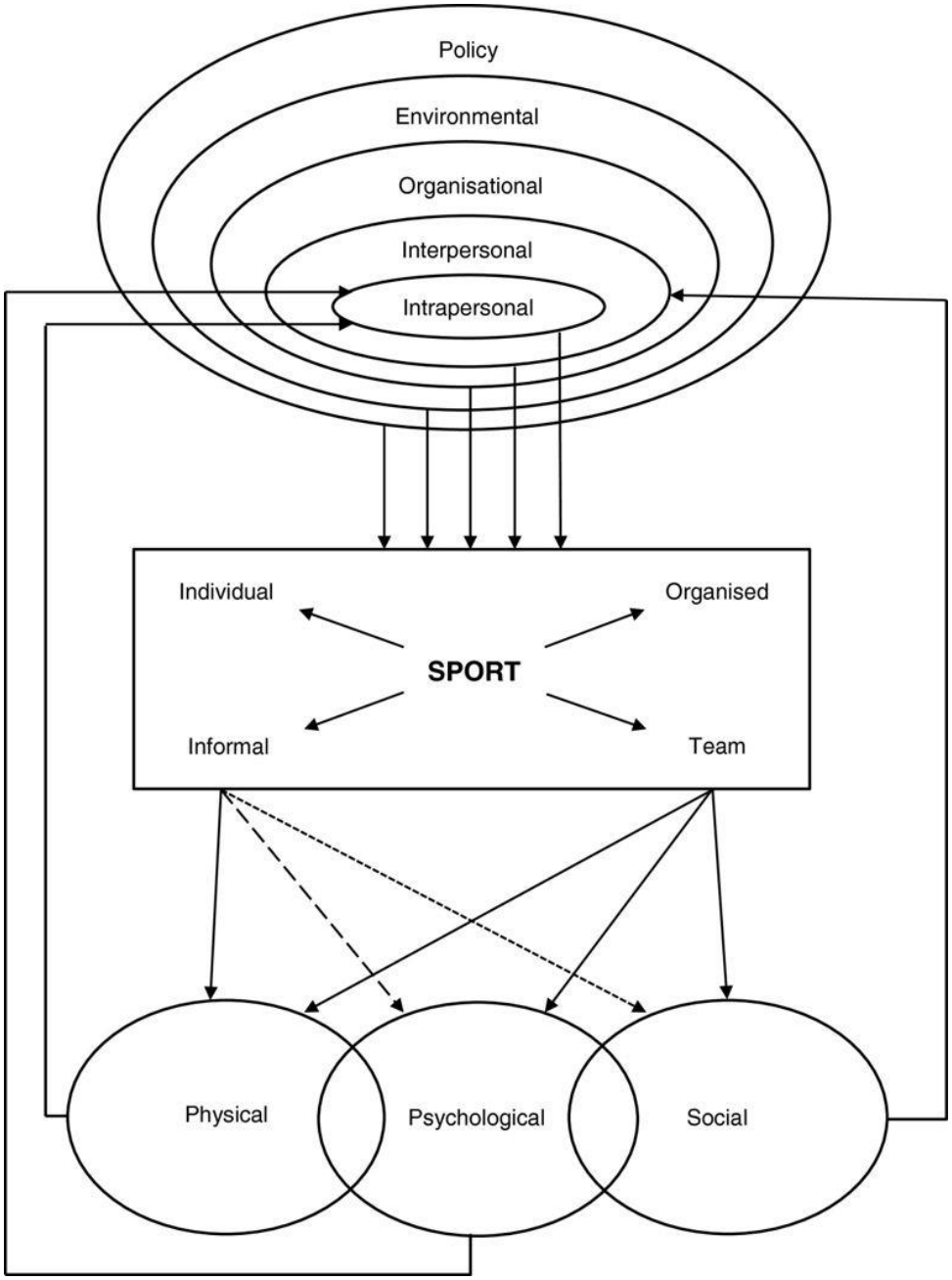


Figure 1. HTS conceptual model (Eime et al., 2013)

HTS model. This model highlights the relationship between determinants that drive PA, sport itself and the outcomes or reported benefits of participation (see figure 1). It proposes three primary categories of health outcome (physical, psychological and social) and two secondary categories (psychosocial and physical/psychological). Based on the social ecological approach (Sallis & Owen, 2015), it depicts determinants of participation as concentric rings spreading outwards from individuals' intrapersonal characteristics, to

widening spheres of influence. The sport aspect involves both team and individual sports as well as variants (e.g. running in a group). The three health outcomes are illustrated as overlapping to represent the interactions between them. For example, relationships made through team sports may satisfy a need for belonging and, as such, enhance psychological wellbeing and social skills. Its benefit over more traditional models based on a medical understanding of disability, is that it considers societal and environmental factors in participation. This is largely ignored by models such as the Psychological Continuum model (PCM; Funk & James, 2001), which explain participation through the psychological relationship an individual may form with a sport object such as a team or activity.

PA Outcomes for Individuals with ASC

Whilst there is an emerging body of research exploring the benefits of PA for individuals with ASC, initial investigations have focussed largely on physical health outcomes (e.g. Pitetti, Rendoff, Grover, & Beets, 2007). A fraction of this research however, has considered the positive impact on core features of ASC. Improvements in social behaviour (Pan, 2010), communication skills (Hameury et al., 2010), stereotyped behaviours (Yilmaz, Yanardağ, Birkan, & Bumin, 2004; Elliott, Dobbin, Rose, & Soper, 1994) and sensory sensitivities (Bass, Duchowny, & Llabre, 2009) have all been demonstrated in individuals with ASC after participation in PA interventions. For a meta-analysis, see Sowa & Meulenbroek (2012). Although limited, research has also investigated the effects of PA on associated difficulties of ASC, for instance in reducing challenging behaviour (Allison, Basile, & MacDonald, 1991).

Our understanding of what helps promote such benefits and how to engage more YP with ASC in PA, is limited. Recently, research has explored the barriers and facilitators to participation in PA for this population using similar constructs to those in the HTS model (Eime et al., 2013). The key factors included intrapersonal considerations such as a preference for

technology-based activities, interpersonal factors such as the lack of an exercise partner and community factors such as limited appropriate community provision (Obrusnikova & Cavalier, 2011; Obrusnikova & Miccinello, 2012; Must, Phillips, Curtin, & Bandini, 2015). Regarding this last factor, many parents reported feeling dissatisfied with the level of experience and expertise within community programmes to be able to provide appropriate coaching and supervision to their children. Parents not only felt clubs excluded YP, but it is possible parents themselves also felt unwilling to allow their child to attend sessions.

The Role of the Coach

In competitive sports, coaches are considered vital, providing instruction, guiding the practice of skills and giving feedback. They must take on multiple roles to ensure they achieve the best, being a teacher, a motivator and a strategist and are believed to be able to positively affect individuals' engagement, performance, behaviour and wellbeing (Horn, 2002). To do this, they must be effective in their coaching. Various models of measuring and defining this effectiveness have been developed.

Models of coaching. Sports coaching is a complex social process created and maintained by a set of reciprocal interpersonal relationships and permeated by contextual constraints (Vella, Oades, & Crowe, 2010). Several models of coaching have been proposed, however these are largely limited to mainstream environments. While they allow coaches to ground their practice in definitive principals and for coaching training programmes to be informed by research (Saury & Durand, 1998), they often leave little room for considering the role of individual differences in participation and engagement. Disability coaching therefore remains largely unexplored, despite the importance of developing formalised structures to enable coaches to engage YP with disabilities in PA.

Much of what exists of current literature in disability coaching is reflective of an alignment with the medical model of disability. Townsend et al. (2016) argue models of

coaching should be carefully considered alongside models of disability, for coaches to examine their assumptions about athletes with disabilities and the consequences these have. For example, coach beliefs about disability are thought to implicitly and explicitly manifest themselves in coach behaviour, discourse, practice-types, beliefs about talent and judgements about disabled athletes (Cregan, Bloom, & Reid, 2007).

Models outlining the role of psychological factors in coaching and aligning more with the social model of disability therefore, are considered helpful in broadening understanding of what are deemed to be the barriers to effective coaching for all. The coaching efficacy (CE) model (Feltz, Chase, Moritz, & Sullivan, 1999), for example, recognises the importance of the extent coaches believe in their capacity to affect the learning and performance of their athletes, consisting of four dimensions (figure 2). It emphasises the importance of the coaches psychological state on athlete's performance and engagement rather than solely focussing on athlete ability or disability. Within this model, increased CE is believed to result in more effective coaching and thus better athlete/team outcomes (Kavussanu, Boardley, Jutkiewicz, Vincent, & Ring, 2008).

Motivation Efficacy The confidence in one's ability to influence psychological skills and states of athletes.	**Game Strategy Efficacy** The belief one can lead their team to success in competition
Technique Efficacy Relating to belief in one's ability to instruct skills and identify difficulties.	**Character-building Efficacy** The belief in one's ability to influence personal development and positive attitude towards sport in athletes.

Figure 2: Coaching Efficacy Model (Feltz et al., 1999)

Barriers to participation from a coaching perspective. Taking the principles from the CE model alongside the HTS model (Eime et al., 2013), one significant barrier to participation for YP with ASC might be from an organisational level. That is, a lack of

understanding of ASC among coaches, may contribute to YP's exclusion and reduce the positive benefits they receive from PA. A limited knowledge regarding the impact of 'hidden' difficulties such as heightened anxiety in social situations, sensory challenges and difficulties in understanding abstract language, might be influencing coaches' abilities to fully engage their YP with ASC. Kavussanu et al. (2008) state variables such as prior coaching experience and social support from parents may be important in CE. It seems parents of YP with ASC may have limited confidence in community coaches (Must et al., 2015) and this narrative may therefore be adding to disability sports coaches feeling underequipped.

Summary and Rationale

Considering the importance placed on the role of the coach in mainstream sports and recognising the dearth of resources and training available to disability sports coaches in relation to ASC, it seems important to bring together information regarding best practice in this field. There is a very small body of literature from organisations such as the National Autistic Society (NAS) and Intellectual Disability (ID) forums, for example, guidance around working with young people with ASC in sporting environments (NAS, 2016). There remains considerable scope to develop the knowledge base further though, by drawing upon the opinions and views of experienced coaches currently working with YP with ASC in sport, to learn from experts in the field about what they feel works well. By disseminating these findings to sports clubs and coaching bodies, it is hoped that CE may be increased, providing the necessary confidence to individuals to reach out and include more YP with ASC in sports.

Research Questions

1. What are coaches' experiences of coaching YP with ASC?
2. What are the challenges in coaching YP with ASC?
3. What works well in engaging and motivating YP with ASC in sports?

Method

Aim

To explore the experiences of coaches who work with YP with ASC, including obtaining a better understanding of the challenges they face and the strategies that are most effective in promoting skills development and wellbeing.

Design

A qualitative non-experimental design was employed to investigate the aim outlined above. The study adopted a critical realist stance (Collier, 1994) which assumes that participants' retelling of their experiences is constructed and reconstructed through language and memory. This understands that experiences are shaped and influenced by the process of discussion but also by emotion and contextual facts.

Individual interviews, conducted, transcribed and analysed using thematic analysis (Braun & Clarke, 2006), were used to investigate participants' experiences. This was felt an appropriate method as it allows for flexibility while retaining a rich and holistic understanding of participant's experiences. Other methodologies, for example a Delphi study (Powell, 2003) may also have enabled the understanding of experiences and opinions, however, the lack of existing literature in this field may have made the development of initial questions extremely difficult, and not necessarily led to examples of good practice. The limitations of thematic analysis in this context included the potential for the flexibility of the method to lead to inconsistency and a possible lack of coherence (Nowell, Norris, White, & Moules, 2017). These concerns however, were not thought to be major problems in the conduct of this study.

Through discussion with the research team and review of the literature, a 30-40 minute semi-structured interview schedule was constructed (Appendix B), enabling exploration of individuals' experiences of coaching athletes with ASC and discussion of ideas about effective strategies as well as challenges faced.

Ethical Approval

Ethical approval was obtained from the University Ethics Panel (Appendix C). Approval was also sought from the NAS in order to advertise with them and utilise connections to sports clubs and coaches. The study was conducted in accordance with the British Psychological Society code of ethics and conduct (2018).

Additional ethical approval was requested following the decision to recruit two YP with ASC to provide feedback and validation of the findings from coaches. A copy of the amendment letter is included in Appendix D along with email confirmation from the chair of the ethics board (Appendix E). An end of study letter (Appendix F) was sent to all participants involved and to the ethics board.

Participants

Initially, 18 individuals expressed an interest in participating. Of these, six did not respond to further emails and two could not participate due to work commitments. This resulted in 10 individuals participating in the interviews (4 female; 6 male, aged between 20 and 72). Of these, two coaches identified themselves as having a diagnosis of ASC. Nine participants identified as White British and one participant identified as White Irish. Participants had a mean of 9.2 years coaching experience of coaching athletes with ASC and coached a variety of sports (for demographics of coaches see Table 1).

Inclusion and Exclusion criteria. Participation required coaches to hold a relevant qualification for coaching in their sport, with a minimum of one year of experience of coaching athletes with ASC. Participants were excluded if they had never coached athletes with ASC or if their athletes were mostly aged 18 years and over as the focus of this study was on YP.

Table 1.

Demographic Details of Participants

Participant	Gender	Age	Sport	Years coaching	Coaching Level	Additional Information
P1	F	38	Swimming	10	Local	N/A
P2	M	20	Multi-sport	3	Local	ASC diagnosis
P3	M	29	Hockey	5	Local	N/A
P4	M	68	Hockey	7	Local	N/A
P5	F	38	Athletics	3	Local	N/A
P6	M	30	Athletics	6	Local	N/A
P7	M	21	Cricket	2	Local	ASC diagnosis
P8	F	72	Swimming	45	Local/National	N/A
P9	F	36	Boxing	6	Local	N/A
P10	M	31	Trampolining	5	Local/National	N/A

Procedure

Recruitment. Participants were recruited using a purposive sampling strategy. Potential participants were identified through an online search of disability sports clubs and liaison with staff at the NAS. An initial email was sent to those appearing to meet criteria for inclusion and follow up emails were sent to those who did not respond, offering a second chance to participate. Individuals interested in participating were then sent an information pack which included the information sheet (Appendix G) and consent form (Appendix H). Two participants chose to have a phone conversation with the lead researcher in advance of the interview to find out more about the research.

Data collection. Consent forms were sent to participants in advance of the interview. Four participants returned these electronically, while five participants provided consent over the telephone and one via email. The author conducted all 10 interviews: nine on the telephone and one in person. All interviews were recorded via a handheld Dictaphone. Interviews were

conducted over a six-month period, with each individual interview lasting between 30 and 40 minutes. Additional time was provided for participants to ask questions at the end of the interview. Interviews were then transcribed verbatim and saved to an encrypted memory stick for analysis.

Analysis

Interview data were analysed using thematic analysis (Braun & Clarke, 2006). Analysis was approached from a critical realist perspective (Willig, 1999), recognising the author's active role in drawing out and interpreting themes (Ely, Vinz, Downing, & Anzul, 1997). As little relevant literature exists, analysis was conducted inductively, in a data-driven manner and without a theoretical frame. The analysis focussed on main semantic themes rather than attempt to exhaust all possibilities. These themes were derived through repeated reviewing of the transcripts. For an example coded transcript see Appendix I.

Enhancing and Demonstrating the Quality of the Research

Yardley (2008) reports four principles to demonstrate the rigour of qualitative research. These include, sensitivity to context, commitment and rigour, transparency and coherence, and impact and importance. These principles are described as open and flexible and Yardley states that no single study need demonstrate all four criteria.

In line with these principles, validity was enhanced by transcripts being coded by the lead researcher, with 20% being co-rated by another researcher and themes being adjusted through discussion. The lead researcher was also interviewed about assumptions, values and beliefs prior to analysis of data using a bracketing interview approach (Tufford & Newman, 2010). This helped to identify biases and preconceptions potentially influencing the interpretation and analysis of data. A research diary was kept to enhance transparency and rigour and reduce bias by documenting the researcher's opinions and feelings about the process

of the research including thoughts on readings and conversations. For example extracts from this, see Appendix J.

In addition to this, two YP with ASC were interviewed following transcription and analysis of the main data set (see Appendix K for interview schedule) regarding their perspectives on the coach's opinions. This provided an insight into the impact and importance of the findings as well as the resonance with the reader (Tracy, 2010).

Interview procedure for YP with ASC. Two YP with ASC attending a specialist school were recruited through the NAS. They had no connection to the coaches involved in the interviews and did not have a comorbid ID. Both were aged 14 and identified as White British. Initially, the YP's parents were contacted to obtain permission to speak with the YP. Following this, the lead researcher discussed the participant information sheet (Appendix L) and consent form (Appendix M) with the YP individually to ensure they understood the nature and purpose of their involvement. Considering the YP's potential vulnerability, this discussion was of paramount importance. They were informed of their ability to stop the interview at any time and to withdraw their data from the study. Following written informed consent, a telephone interview was conducted in which the YP were asked to provide a few details about their own participation in sports and experiences of being coached, before responding to questions regarding their level of agreement on the five ideas generated through the interviews with coaches. These discussions were recorded using a handheld Dictaphone.

While a focus group with the coaches who took part in the interviews may have been a useful addition to provide respondent validation, their breadth of geographical location meant this was not possible and individual interviews with many was not feasible within the time constraints of this project. Although interviewing YP with ASC helped to understand how the findings resonated with the reader and relevant population, this method of validation was limited in that the participants themselves did not provide feedback on the themes developed by the research team. This made it more difficult to be sure of the impact of bias on the

interpretation of the results and did not provide an opportunity for participants to demonstrate agreement or disagreement with the final themes.

Results

Five main themes were derived from the transcribed interviews. Table 2 outlines these along with associated subthemes. Each theme is described in detail below, with subthemes underlined and illustrative quotes italicised and indented. A thematic map is presented in Appendix N and a table of codes and subthemes to demonstrate theme development with additional illustrative quotes is provided in Appendix O.

Table 2

Themes and Subthemes Emerging from Data.

Theme	**Subtheme**
Coach-Athlete Relationship	Understanding your athlete's ASC: Challenges for participation Understanding your athlete's ASC: The benefits in sport Coach characteristics Pastoral Care
Coaching Strategies	Communication Structure Approach to Session Environmental Considerations
Benefits of Participation	Personal Development Enjoyment Physical Health
Behaviour Management	Discipline Positive Reinforcement Consistency
ASC and PA	Inclusive vs. Disability Specific Sessions Training/Resources for Coaches

Theme One: Coach-athlete relationship

A prominent theme emerging from the data, representing ideas from all participants, was the **coach-athlete relationship**. This relationship was described as important for encouraging participation and in helping athletes make the most of sessions. Subthemes

included Understanding your athlete's ASC: Challenges for participation, Understanding your athlete's ASC: The benefits in sport, Coaching characteristics and Pastoral care.

Understanding your athlete's ASC: Challenges for participation, was discussed by all ten participants, stressing the importance of getting to know the YP and working in a person-centred way:

> *"Every young person with ASC is very very very very very very very different" (P2).*

Some of the most frequently reported challenges in relation to a YP's ASC were: difficulties with engagement and motivation, communication problems, anxiety, behavioural difficulties and motor skills deficits. Importantly, the diversity of athletes was recognised in relation to these challenges, with some participants coaching YP with comorbidities such as ID. It is important to consider how such comorbidities may impact on the ASC-related challenges outlined above. Some difficulties however, appeared to be unrelated to ID comorbidity, for example, engagement issues:

> *"Sometimes it's the initial motivation…but sometimes it can be weekly, even if they enjoy it" (P6).*

And the impact of anxiety on this:

> *"Some people with ASC can get quite anxious, oh what are we going to do today" (P7).*

Other factors were perhaps more heavily related to ID comorbidity. Several coaches discussed athlete's difficulties with communication, both in making themselves understood and in understanding and correctly interpreting a coach's instructions:

> *"The first time I did anything in a school I said…pick up the ball, meaning pick up speed. And of course, the boy stopped, picked up the ball and handed it to me" (P4).*

Participants also commented on behavioural challenges within sessions, having to manage several different presentations within a large group. Further, six of the participants commented on athlete's core motor skills such as coordination and mobility:

> *"We had a young female who was 13 who just could not get her body to do what she wanted it to" (P9).*

The second subtheme; Understanding your athlete: The benefits to sport, incorporated a more balanced view of PA and ASC. Participants described positive aspects of an individual's ASC, for example, how individuals could be very determined and focussed:

> *"If they've got interest in the sport…their focus is amazing" (P9).*

Some related this to specific aspects of the ASC diagnosis:

> *"I think some of their focus and determination is rooted in the Autism…their determination and single-mindedness with the task at hand, that can be quite helpful" (P5).*

Others discussed how this focus may be viewed as a special interest, promoting practice of the skills:

> *"They are absolutely obsessed with badminton, so they play it all the time" (P2).*

Other ASC-related positives concerned precision, for example, an ability to remember exactly what the coach has said or to replicate physical demonstrations. This also appeared to present challenges however:

> *"Sometimes athletes will pick me up and say 'well you said put your left foot down and then jump and then you showed us with your right foot!'" (P6).*

Finally, one participant commented on the benefit of rule following, which in sport had real advantages:

> *"He's not a dirty player because he sticks to the rules, he focuses on the skills rather than being had up all the time for misbehaving and breaking the rules" (P8).*

Coaching characteristics was the third subtheme, discussed by several participants. Many reported that for the coach-athlete relationship to be successful and to gain an athlete's respect, it was important to be genuine:

> *"Be yourself and be genuine" (P9).*

A key part of being oneself was related to gaining an athlete's respect and making a good impression:

> *"You make a bad impression with kids with ASD and that's it, you'll lose them, and they won't want to come" (P7).*

A further element considered vital in promoting the coach-athlete relationship was trust, with some participants commenting on the importance, but difficulty in building this:

> *"I think trust is important as well, I've got one little girl at the moment…she is five…it's taken me about two months for her to start talking to me but now she's actually accepted me and she trusts me" (P9).*

Participants also described the use of humour to build a solid and effective relationship:

> *"Humour's quite important" (P1).*

Finally, they stressed the importance of demonstrating empathic characteristics:

> *"Be kind, be tolerant and listen" (P5).*

Pastoral Care was the final sub-theme. This related to participants' ideas about the importance of broadening the relationship between coach and athlete to involve aspects of role modelling and mentoring:

> *"A lot of it is coming in and helping them with their sport, but more importantly helping them with life skills…using our experiences of what we have gone through to inspire and motivate young people" (P7).*

These ideas were shared by many participants, who reported the pastoral element of the relationship to be as important as providing skills coaching:

> *"Pretty much everything comes in to it you know, the hockey is probably the smallest part of it I think" (P4).*
>
> *"I want the kids to be able to bring to me problems that they have within the group and if they want to talk to someone, just widening the circle of adults they can talk to, who they feel listen to them and respect their opinion" (P5)*

Theme Two: Coaching Strategies

The second theme, **Coaching strategies** was also prominent within the data, incorporating four subthemes; Communication, Structure, the Approach to the session and Environmental considerations.

Perhaps the most salient message from the sub-theme communication was that instructions to athletes should be brief, simple and visual where possible. As discussed previously, the level of athletes' communication abilities may be connected to comorbid diagnoses, such as ID. Some strategies however, were considered important for YP with ASC regardless of their cognitive ability:

> *"Communication is key, making sure you only give small pieces of information at a time" (P3).*

Repetition was also discussed:

> *"There is a huge amount more repetition that is required" (P9).*

The use of visual aids or demonstration was agreed to be effective:

> *"We use a lot of demonstration, so when I'm teaching…if I'm saying do backstroke, l show the backstroke arms" (P1).*

Using demonstrations in this way was described as useful by others:

"More visual demonstrations" (P10).

For those with ASC and ID, the implementation of more basic communication tools were viewed as helpful, for example, the use of social stories[2]

"[His parents] produced a wonderful social story for him which, they bring…depending on what we're doing in that session, they will go through it with him before he even gets in the water" (P8).

Some participants reflected on the diversity of YP with ASC in relation to their learning needs:

"You will do an initial explanation to everybody in the group and…different parts of your explanation are grasped by different athletes…you need to take the time to find different ways of explaining the same thing" (P5).

While others picked up on more general difficulties such as understanding abstract language:

"Be very plain in your language, avoiding the use of metaphors" (P5).

"We call it Froggy stroke actually (laughs), if you call it breaststroke they won't do anything!" (P1).

Finally, a few participants discussed how it was difficult to recognise whether athletes were listening, with YP with ASC not always demonstrating typical non-verbal cues, such as maintaining eye contact:

"You might think that they weren't looking at you, they weren't taking information in in the way that you would expect from everybody else you know, but they are listening, it is going in" (P5).

Some considered how important it therefore is to accommodate this:

"Don't insist on [the athlete] looking at you, don't think they're misbehaving if they're sort of looking around, because chances are they

[2] Social Stories are short, often visual descriptions of a specific situation, event or activity and include information about what to expect in that situation and why (Gray & Garand, 1993).

are taking in what you are saying, but showing no signs of doing that until they start the activity" (P8).

The second sub-theme was Structure, which encompassed participants ideas about how sessions should be organised. Many participants spoke of the need for establishing and maintaining a routine within PA sessions:

"Something that does help me as a coach for someone specifically with Autism is the routine of the session...so we have a welcome registration, we have a warm-up, we have the main session, warm-down, finish and a goodbye" (P6).

Two participants also noted how extra planning was perhaps needed in disability sessions:

"I certainly would say I would plan the sessions a bit more" (P3).

Within this planning however, the need to be flexible and adaptable was stressed:

"What you have to do is just look at the group in front of you and if plan A doesn't work you have to play plan B" (P4).

Finally, the type of activity was discussed by participants as being important; considering group-based or individual activities. One participant discussed how difficult group work could be:

"Group work…that can sort of spiral out of control, especially if loads of people are talking at once…which is why I sort of do the one on one sort of basis" (P2).

Some participants reported group work was possible as long as it was well structured:

"We certainly would have got into some game situations at some point but…I would tend to break them down so it's almost working by themselves or in a much smaller group, to start off with anyway" (P4).

Most agreed teaching individual skills in small groups was most helpful, and allowing more time for activities was important, with group work or whole games at the end of sessions.

The third sub-theme, Approach to the session, encompassed ideas around being patient and person-centred and importantly, enjoying coaching. Patience was highlighted by several participants as a key skill in coaching YP with ASC:

> *"It's all about patience with a young person with ASC. It might take them months to pick up a skill, the coach needs to be prepared for that" (P2).*

These ideas extended to considering expectations, being careful to not set them too high or too low:

> *"Don't put any barriers on them, don't walk into a session…thinking they will never be able to achieve that…my girl that got onto the GB team…that was beyond all of our wildest dreams!" (P10).*

Thus, ensuring sessions are pitched at the right level, and coaches having the right approach may help the athlete make the most of every session.

Further, several participants outlined the importance of having fun themselves, as this could have a big impact on the athlete's enjoyment:

> *"Just to enjoy it! Enjoy yourself with them. If you're enjoying it, they will love it" (P7).*

Finally, Environmental considerations were discussed by several participants, describing how important it was to plan for the safety and comfort of athletes with ASC. This was perhaps particularly important for those coaching YP with an additional ID. For example, considering the coaching space:

> *"It's in its own little area, not in the main gym…in your own kind of space, it's quite enclosed and it feels very secure…we don't leave that area so it's very easy to control all the athletes within the session, so they can't just run off anywhere" (P10).*

Others discussed the importance of having extra staff members or higher ratios of staff to athletes:

> *"The autism groups we work with would be a lot more support staff and volunteers on board. So there tends to be a lot more sort of one-to-one support" (P3).*

Some participants talked about how to manage physical wellbeing and sensory needs:

> *"You get a day like today and they'll turn up with an overcoat on and start running around…the thing is to make sure they're not too hot, they're not too cold, make sure they have plenty to drink" (P4).*

One participant talked about the difficulty of getting athletes used to different sensory experiences relating to their sport:

> *"A lot of kids with Autism will struggle with water getting on their face and their eyes, so there's a lot of focus on making sure they get used to that first" (P1).*

This participant also discussed how strategies that may be helpful for neurotypical athletes might need adapting to suit an individual's sensory sensitivities:

> *"She was insisting on getting one of our swimmers to balance a float on his head to keep his head still when he's doing backstroke and I kept trying to nicely explain…he's not going to do it because of the sensory aspect of a wet float" (P1).*

Some participants also commented that noise could be distracting and distressing for YP with ASC:

> *"A lot of it can be noise…noise is a big thing, if there's loads of noise around it's very hard to retain their attention and then this can lead them to like a sensory overload, which can lead like to total breakdowns" (P2).*

Theme three: Benefits of Participation in PA

The third theme emerging from the data was related to the various **Benefits of participating in PA** for YP with ASC. This included sub-themes of *Personal development*, Physical benefits and Enjoyment.

The sub-theme Personal development was discussed by several participants, with consideration paid to aspects such as development of general life skills:

> *"The sessions aren't just about sport, they're about cooperation, they're about integrating with other people, they're about life skills that are important to get by in general society" (P5).*

As well as the development of more specific skills such as social interactions:

> *"It's an individual sport but we'd often have teamwork going on…it's something that we focus on quite a lot…we want people to interact and pilot their own social interactions" (P6).*

Participants also discussed how participation provided an opportunity for athletes to feel included and build friendships:

> *"It might just be to make new friends and have a wider social circle and somewhere to belong to" (P6).*

Some talked about how this might impact on athletes' confidence and self-esteem:

> *"Maybe giving a sense of worth I'm not sure, they feel included, they are doing something right, they don't think, 'I can't do it'" (P10).*

Others described how beneficial it can be for their athletes to achieve something and experience success:

> *"I like to see the athletes succeeding and doing well but I think it's about personal development and giving the kids something they can really excel at" (P5).*

A second sub-theme from the data was Enjoyment. Many participants noted how much YP enjoyed their sessions:

> *"If they're having fun they blooming well let you know, which is great, we have a good old laugh in our sessions and that's joyful for me as well" (P10).*

Some commented on their role in this and how enjoyment could influence motivation to attend:

> *"If they enjoy coming and they feel comfortable…they love it…which obviously keeps them coming back again and then they learn better because they're being happy there" (P9).*

Finally, the third sub-theme was Physical benefits, which included aspects of physical health such as keeping fit and healthy:

> *"Just that healthy lifestyle" (P9).*

As well as improvements seen in motor skills:

> *"Working on balance, timing, rhythm, coordination, spatial awareness, and fine motor control" (P10).*

Theme four: Behaviour Management

The fourth theme, **behaviour management**, included different ways of managing Discipline within sessions and consideration of Positive reinforcement strategies as well as the importance of Consistency.

Discipline was discussed by several participants, commenting on ideas about managing challenging behaviour as well as methods that do not work so well. One participant spoke about how picking battles was important:

> *"Well I sort of pick my battles. So, if they're doing anything that's dangerous then yeah, I'd always pull them up about it" (P2).*

This participant went on to reflect how they would handle this:

> *"But I won't pull them up actually in the session itself, I'd do it on a one-on-one basis…it's like having that one-on-one talk" (P2).*

The idea of not singling individuals out was a common notion. Having the time and resources to speak to the individual about what has happened seemed important:

> *"We talk about things to try and resolve things, rather than no you can't do that…there's an explanation behind the no" (P6).*

Equally, participants generally felt discipline techniques such as raising their voice or blowing the whistle had to be considered carefully for individuals with ASC:

> *"I think traditional coaching is with a stopwatch and whistle…but it's adapting that to make sure I'm standing near someone with hearing impairment so they can hear the whistle but far enough away from someone who really doesn't like loud noises" (P6).*

Another important part of discipline discussed was the involvement of parents:

> *"Talking to parents, learning from parents what works, what works at home if they've got difficulties at home with behaviour" (P8).*

The importance of balancing parent's inclusion versus potential over-involvement was debated though:

> *"Sometimes I find it a bit interfering but sometimes actually it's really helpful for parents to say, listen to [the coach]" (P1).*

The second sub-theme, Positive reinforcement depicts how participants felt behaviour management strategies such as praise and reinforcement were useful:

> *"Always use positive praise. If a young person is doing something amazing, they've mastered that skill, praise it! Just like shout about it. Because they're going to love that positive attention instead of the negative attention" (P2).*

Also, using reframing:

> *"Give positive feedback when they're doing it and changing the negatives into positives with that feedback" (P9).*

Other participants spoke about the use of rewards:

> *"I do think the idea of working with rewards [works]…the idea of you swim one length and then you can [have a reward for example] jump in" (P8).*

Finally, participants spoke about the importance of Consistency in behaviour management. This included having firm boundaries and being clear and consistent with these:

> *"The boundaries and making sure they're really clear and sticking to them. Maybe with kids without learning difficulties the boundaries blur a little bit…but you can't do that at all" (P9).*

Being clear about rules was also discussed as vital:

> *"We have to insist on walking round the pool and that being one of the most important rules" (P8).*

As was the importance of athletes' knowing what is expected of them inside and outside of sessions, particularly in relation to sports that are dangerous to practice at home:

> *"Making sure that rules are clear…we have to reiterate more with some of the kids with Autism that it's not something they take out of the club…she would go home and hit her sister because she's practising boxing…we just remind her of the rules and she stopped doing it" (P9).*

Again, these ideas are important to consider within the context of athletes' abilities and understanding. Clearer rules and boundaries may be needed more for those with an ID who may be less able to manage their own behaviour.

Theme five: ASC and PA

The final theme encapsulates participants ideas around disability coaching, specifically relating to aspects such as debate around Inclusive vs. disability-specific sessions and the Training and resources available for coaches.

The first sub-theme, Inclusive vs. disability sessions reflects participants ideas about the best platform for athletes with ASC to participate and compete in PA. Some felt strongly inclusion was important:

> *"If anyone joins our club, they can be of any size and shape, we will find a way to know what that person can achieve and to try" (P6).*

Others appeared cautious about inclusion, particularly into mainstream clubs:

> *"I've got a passion for inclusion but only when I feel it is the right inclusion" (P8).*

This participant also spoke about how working with other clubs to provide the right support could be useful:

> *"He only comes to us once a week because the rest of the time he's back into the mainstream club...they asked us to have him…because they couldn't cope with him and there were behavioural problems…we've now integrated him back into that club" (P8).*

Some participants spoke about negative experiences such as bullying and stigma their athletes had endured when attempting to participate in mainstream clubs:

> *"They've had so many bad experiences with it, especially those that have been integrated into mainstream…there's quite a lot of bad experiences so people tend to shy away from it (P2).*

As well as coaches having not been considerate to the athlete's ASC:

> *"One of them was a very good swimmer, [he] started from the beginning, went on and joined a [mainstream] club, until a coach came and shouted at him, and he's never been near the club since…and avoids swimming apart from in the sea (P8).*

Another participant however, commented on the idea of participating in both disability and mainstream sessions, and had seen this work well:

> *"It's having both types of provision available…I've got a young person who comes to my session every week, but he also attends a mainstream session every week somewhere else and plays football with other people. And then he comes and tells us every week how it's gone" (P2).*

Getting the right support at the right level was viewed as vital to success and some participants spoke about their athletes managing to go on to compete at a very high standard when this was achieved:

> *"We did have a girl…and she actually represented Great Britain in the disability trampolining team" (P10).*

Related to the idea of finding the right support was the sub-theme Training and resources, with participants describing their experiences of coaching courses and what they felt were important things to consider when starting out in disability coaching. Many participants described having had virtually no ASC-specific training, with disability courses often failing to talk about ASC:

> *"The programme which is disability focussed…it was certainly very useful, but I don't think we even used the word Autism" (P3).*

Or perhaps focussing largely on the condition itself rather than the practical application of coaching YP with ASC:

> *"I've been on an Autism course, but it generally was about things like behaviour and social communication and explaining what Autism is, but*

> *nothing that had any practical application, something the coach could take away and say that was really useful" (P6).*

Many coaches spoke instead about having to use trial and error when they first began coaching:

> *"The course didn't prepare me for that kind of stuff, I've had to find that information out or work out for myself as I have coached over the years" (P10).*
>
> *"I think it comes through a bit of trial and error" (P3).*

Impact and Resonance with Reader

Two athletes were involved in an interview with the researcher to determine whether the findings outlined above resonated with YP with ASC (referred to here by pseudonyms: Matt and Isaac). While this was a very brief audit of two YP's opinions, it was helpful in identifying areas where athletes and coaches may agree or differ. For example, both Matt and Isaac agreed strongly with coaches that it is helpful for PA sessions to be structured, however Matt felt this would have to be flexible, for example not sticking to an original plan if it was not working. Both Matt and Isaac strongly agreed it was important for coaches to use short and clear instructions, both stating longer instructions tended to be forgotten. In relation to teamwork, the YP differed in their opinion slightly. Isaac agreed with the coaches, that group work was often difficult and small group games and individual work tended to be best. Matt however, felt group activities could work well provided they were managed effectively. Both YP agreed playing sports was a good way to make friends, with Isaac stating most of his friends had come from his football club. Matt also noted though, this could be harder in individual sports such as Judo. Finally, both YP felt strongly, as did coaches, getting to know the athlete was crucial.

While limited to two YP, these discussions provided an insight to where athletes and coaches may agree or disagree, highlighting the importance of including YP with ASC in research of this kind.

Discussion

In exploring the experiences of coaches of athletes with ASC, three research questions were addressed. These were:

1. What are coaches' experiences of coaching YP with ASC?

2. What are the challenges in coaching YP with ASC?

3. What works well in engaging and motivating YP with ASC in sports?

Five themes emerged from the data, encapsulating ideas around building relationships, coaching strategies, the benefits of participation and challenges for behaviour management and inclusion. Importantly, participants' described feeling disability sports coaching, and particularly working with YP with ASC, was an extremely rewarding and positive pursuit and that YP enjoyed and valued PA sessions.

The Value of the Coach-Athlete Relationship

Perhaps the most notable finding was the importance placed on the relationship between the coach and athlete which, as cited in mainstream sports literature (e.g. Jowett & Poczwardowski, 2007), was considered crucial in enabling engagement and motivation in PA. While this relationship has been explored extensively in mainstream sports, research regarding this concept within disability sports is less comprehensive (Martin & Whalen, 2014) and is significantly lacking for individuals with ASC. Coaches here however, felt they were able to build strong and effective relationships with their YP and that this was a vital part of helping them to succeed in PA.

An important aspect in building this relationship was providing a friendly and fun environment and demonstrating characteristics such as genuineness and trustworthiness. Some

coaches also discussed the use of humour as being a helpful tool. This idea is curious as whilst it corroborates some previous research in the field (Murphy, Burns & Kilbey, 2017), it challenges the idea individuals with ASC may find humour difficult, not understanding jokes or valuing this aspect of communication (Samson, 2013).

Diversity of YP with ASC

Crucially, participants described the importance of recognising the diversity of YP with ASC and working in a person-centred way. While various strategies were discussed as beneficial, such as ensuring effective communication and structuring the session, this was caveated by the idea that each YP is different and what works for some, may be ineffective for others. Understanding the YP and what their individual ASC profile means for participation was believed essential in being able to tailor strategies to suit individual needs. This approach fits with literature in the wider context of supporting YP with ASC using person-centred planning (Sanderson, 2000), which is aimed at enabling individuals to discover their own personal goals and ways of achieving these, playing a greater role in the development of plans for their future (Aylott, 2001).

Recognition of this diversity included acknowledging comorbidities such as ID, which may impact on the type and nature of strategies used. Participants also discussed the importance of involving parents/carers, to help understand the YP and to provide support with behavioural management. Importantly, this involvement was understood to require careful negotiation for it to be effective.

Recognising the Positive Aspects of ASC

While the core features of ASC such as difficulties with social communication and interaction, and restricted or repetitive behaviours or sensory sensitivities can make everyday life difficult (Eaves & Ho, 2008), discussion of their negative impact on participation in sports was limited in the present study. Some participants did note their athletes' communication

skills or preferences could present as a barrier to effectively conveying elements of coaching, or that due to athlete's sensory sensitivities more consideration of the environment and equipment being used was necessary. However, some aspects of the diagnostic profile were discussed solely in relation to the positives they bring to PA. For example, the determination and focus of athletes when they are interested in the sport, and how useful this can be, particularly in sports where practice of specific skills such as shooting, are vital to success.

This is a valuable message and fits with the social model of disability (Llewellyn & Hogan, 2000), where social and environmental barriers are considered to disable an individual rather than specific impairments or differences. When accommodated, challenges typically associated with ASC were not prevalent in PA sessions described here. Research has highlighted the importance of recognising the positive aspects of ASC, as not doing so can have a significantly negative impact on individuals, for example, preventing them from realising their own strengths, talents and potential and limiting society's knowledge and opinions about individuals with ASC (Aylott, 2001).

Benefits of PA

Several benefits for YP with ASC from participation in PA were indicated by coaches, as previous research indicated (see Sowa & Meulenbroek, 2012 for a review). Personal developments in athletes included improvements in social skills and self-esteem, the latter being hypothesised as resulting from experiencing achievement in sport. Reports also described athletes being able to learn to work as a team; aspects seldom described in previous literature. Further, PA was viewed as a good way for YP with ASC to make friends and practice social skills with peers, something echoed by previous literature (Blagrave, 2017).

Limitations of the research

While this research provided a step forward in connecting literature from mainstream and disability sport, limitations must be considered when interpreting the findings. The main

limitation in this study related to the sample. Despite being a relatively new research area, and thus requiring some initial investigation, the sample was fairly limited in size and breadth. Ten participants were interviewed which, although appropriate for the type of analysis, did not provide enough data to be widely generalizable. The coaches were also mostly from grassroots clubs and as such, findings can only be tentatively applied to competitive sports. Further, while efforts were made to include athlete's voices in the study, this was limited to two YP with ASC and two coaches with ASC. The input of the coaches with ASC was beneficial for hearing from individuals who have a dual perspective, being a coach and an individual with ASC. The inclusion of YP with ASC was helpful in providing an insight to the relevance of the findings however, was limited as a method of validation. It did not allow for participants of the study to comment on the interpretation of the findings or provide feedback on the themes developed by the research team. As such, the ability to be clear about the impact of bias on the final themes was limited. Additionally, the YP with ASC were not coached by the coaches interviewed in this study, perhaps making it more difficult for them to provide helpful feedback or to understand the context of participants comments. Discussing the themes with the coaches who took part in the interviews may have been a more useful way of validating the findings.

Clinical implications

An important outcome of this study was YP with ASC benefit from sports participation in various ways, some of which connect to the core features of ASC itself, such as improvements in social communication and social interaction. This has implications for how sport is viewed by clinicians, as it suggests skills learnt during participation may be generalizable and thus, sport may act as a real-world tool for learning and practising such skills.

The role of a clinical psychologist includes informing and educating others about unknown aspects of diagnoses such as ASC. Considering this, the findings of the present study

may be important to share with other professionals, for example, teachers in schools in relation to planning PE lessons to increase confidence and enable YP to get the most from their classes.

A further important implication of this work is the scope it provides for clinical psychologists working with YP with ASC to consider the use of interventions based around PA in their work. Finally, the findings suggested there were some positive aspects to a diagnosis of ASC in relation to participation in PA. These are important to share more widely, as individuals with ASC have experienced considerable bullying and stigma in PA environments, something which may be reduced by an increased understanding of both the challenges but also the positives of the diagnosis.

Research Implications

This research has highlighted the importance of taking a more in depth look at disability sports coaching, focussing on specific conditions such as ASC and how YP within this group are often forgotten or misrepresented by the broader disability sector. It seems many coaches are already doing excellent work with this population and this study has introduced some of this work. For a better understanding of this issue however, a larger-scale project investigating both grass-roots and national/international sporting participation would be beneficial. The perspectives of YP with ASC should also be considered, as, in the present study, this highlighted some differences in opinion. Future research should therefore aim to examine YP's experiences and what they feel works well for them as athletes, perhaps focussing on specific groups within this population, for example, those with or without an additional ID, or those with specific sensory sensitivities. A further area for development would be to put some of the ideas from this project in to action with YP with ASC and their coaches; to attempt to make a coaching programme that is person-centred and effective. The research will be submitted to Journal of Autism and Developmental Disorders (see Appendix P for submission guidelines) in order to disseminate the findings.

Conclusion

This study shows that, despite the barriers to participation of PA, some YP with ASC do engage in sports on a regular basis. There are challenges associated with coaching YP with ASC and, currently, there is insufficient training or resource available to coaches in addressing these challenges. However, participants in the current study were able to describe a range of effective strategies used to support their coaching of YP with ASC. Disseminating the good practice of experienced coaches will be key in reducing the barriers to PA for YP with ASC.

The study also identified some positives to a diagnosis of ASC in relation to sports participation. Future research should aim to increase our understanding of YP with ASC in sport and work to engage more individuals in participating, both at grass-roots and at national and international levels.

Reference List

Allison, D. B., Basile, V. C., & MacDonald, R. B. (1991). Brief report: Comparative effects of antecedent exercise and lorazepam on the aggressive behavior of an autistic man. *Journal of Autism and Developmental Disorders, 21,* 89–94. https://doi.org/10.1007/BF02207001

American Psychiatric Association. (2013). Diagnostic and Statistical Manual of Mental Disorders (Fifth Edition). https://doi.org/10.1176/appi.books.9780890425596

Aylott, J. (2001). Understanding and listening to people with Autism. *British Journal of Nursing, 10,* 166-172. https://doi.org/10.12968/bjon.2001.10.3.12361.

Bass, M. M., Duchowny, C. A., & Llabre, M. M. (2009). The effect of therapeutic horseback riding on social functioning in children with Autism. *Journal of Autism and Developmental Disorders, 39,* 1261–1267. https://doi.org/10.1007/s10803-009-0734-3

Blagrave, J. (2017). Experiences of children with autism spectrum disorders in adapted physical education. *European Journal of Adapted Physical Activity, 10,* 17–27.

Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology, 3,* 77–101. https://doi.org/10.1191/1478088706qp063oa

British Psychological Society. (2018). Code of ethics and conduct: Guidance published by the ethics committee of the British Psychological Society. Retrieved from https://www.bps.org.uk/news-and-policy/bps-code-ethics-and-conduct.

Casey, M. M., Eime, R. M., Payne, W. R., & Harvey, J. T. (2009). Using a socioecological approach to examine participation in sport and physical activity among rural adolescent girls. *Qualitative Health Research, 19,* 881–893. https://doi.org/10.1177/1049732309338198

Collier, A. (1994). Critical Realism: An Introduction to Roy Bhaskar's Philosophy. Verso.

Cregan, K., Bloom, G. A., & Reid, G. (2007). Career evolution and knowledge of elite coaches of swimmers with a physical disability. *Research Quarterly for Exercise and Sport, 78*, 339–350. https://doi.org/10.1080/02701367.2007.10599431

Curtin, C., Jojic, M., & Bandini, L. G. (2014). Obesity in children with autism spectrum disorder. *Harvard Review of Psychiatry, 22*, 93–103. https://doi.org/10.1097/HRP.0000000000000031

Dziuk, M. A., Larson, J. C. G., Apostu, A., Mahone, E. M., Denckla, M. B., & Mostofsky, S. H. (2007). Dyspraxia in autism: Association with motor, social, and communicative deficits. *Developmental Medicine & Child Neurology, 49*, 734–739. https://doi.org/10.1111/j.1469-8749.2007.00734.x

Eaves, L. C., & Ho, H. H. (2008). Young adult outcome of autism spectrum disorders. *Journal of Autism and Developmental Disorders, 38*, 739–747. https://doi.org/10.1007/s10803-007-0441-x

Eime, R. M., Young, J. A., Harvey, J. T., Charity, M. J., & Payne, W. R. (2013). A systematic review of the psychological and social benefits of participation in sport for children and adolescents: Informing development of a conceptual model of health through sport. International *Journal of Behavioral Nutrition and Physical Activity, 10*, 98. https://doi.org/10.1186/1479-5868-10-98

Ekeland, E., Heian, F., Hagen, K., & Coren, E. (2005). Can exercise improve self-esteem in children and young people? A systematic review of randomised controlled trials. British *Journal of Sports Medicine, 39*, 792–798. https://doi.org/10.1136/bjsm.2004.017707

Elliott, R. O., Dobbin, A. R., Rose, G. D., & Soper, H. V. (1994). Vigorous, aerobic exercise versus general motor training activities: Effects on maladaptive and stereotypic behaviors of adults with both autism and mental retardation. Journal of Autism and Developmental Disorders, 24, 565–576. https://doi.org/10.1007/BF02172138

Ely, M., Vinz, R., Downing, M., & Anzul, M. (1997). On Writing Qualitative Research: Living by Words. London: Routledge

Favazza, P. C., Siperstein, G. N., Zeisel, S. A., Odom, S. L., Sideris, J. H., & Moskowitz, A. L. (2013). Young athletes program: Impact on motor development. *Adapted Physical Activity Quarterly, 30,* 235–253. https://doi.org/10.1123/apaq.30.3.235

Feltz, D. L., Chase, M. A., Moritz, S. E., & Sullivan, P. J. (1999). A conceptual model of coaching efficacy: Preliminary investigation and instrument development. *Journal of Educational Psychology, 91,* 765–776. https://doi.org/10.1037/0022-0663.91.4.765

Funk, D., & James, J. (2001). The psychological continuum model: A conceptual framework for understanding an individual's psychological connection to sport. *Sport Management Review, 4,* 119-150. https://doi.org/10.1016/S1441-3523(01)70072-1

Gray, C. A., & Garand, J. D. (1993). Social Stories: Improving responses of students with Autism with accurate social information. *Focus on Autistic Behavior, 8,* 1–10. https://doi.org/10.1177/108835769300800101

Hameury, L., Delavous, P., Teste, B., Leroy, C., Gaboriau, J.-C., & Berthier, A. (2010). Équithérapie et autisme. Annales Médico-Psychologiques, *Revue Psychiatrique, 168,* 655–659. https://doi.org/10.1016/j.amp.2009.12.019

Horn, T. S. (2002). Coaching effectiveness in the sport domain. In Advances in sport psychology, 2nd ed (pp. 309–354). Champaign, IL, US: Human Kinetics.

Howie, L. D., Lukacs, S. L., Pastor, P. N., Reuben, C. A., & Mendola, P. (2010). Participation in activities outside of school hours in relation to problem behavior and social skills in middle childhood. *Journal of School Health, 80,* 119–125. https://doi.org/10.1111/j.1746-1561.2009.00475.x

Jowett, S., & Poczwardowski, A. (2007). Understanding the coach-athlete relationship. In S. Jowette & D. Lavallee (Eds.). Social Psychology in Sport (3-14). Champaign, IL, US: Human Kinetics.

Kavussanu, M., Boardley, I. D., Jutkiewicz, N., Vincent, S., & Ring, C. (2008). Coaching efficacy and coaching effectiveness: Examining their predictors and comparing coaches' and athletes' reports. *The Sport Psychologist, 22*, 383–404. https://doi.org/10.1123/tsp.22.4.383

Llewellyn, A., & Hogan, K. (2000). The use and abuse of models of disability. *Disability & Society, 15*, 157–165. https://doi.org/10.1080/09687590025829

Martin, J. J., & Whalen, L. (2014). Effective practices of coaching disability sport. European *Journal of Adapted Physical Activity, 7*, 13-23. DOI: 10.5507/euj.2014.007.

Murphy, M., Burns, J., & Kilbey, E. (2017). Using personal construct methodology to explore relationships with adolescents with Autism Spectrum Disorder. *Research in Developmental Disabilities, 70*, 22-32. https://doi.org/10.1016/j.ridd.2017.08.006.

Must, A., Phillips, S., Curtin, C., & Bandini, L. G. (2015). Barriers to physical activity in children with autism spectrum disorders: Relationship to physical activity and screen time. *Journal of Physical Activity & Health, 12*, 529–534. https://doi.org/10.1123/jpah.2013-0271

National Autistic Society. (2016). Autism, sport and physical activity. Retrieved from: https://www.autism.org.uk/professionals/others/activity-sports.aspx

Nowell, L. S., Norris, J. M., White, D. E., & Moules, N. J. (2017). Thematic analysis: Striving to meet the trustworthiness criteria. *International Journal of Qualitative Methods*, *16*, 1609406917733847. https://doi.org/10.1177/1609406917733847

Obrusnikova, I., & Cavalier, A. R. (2011). Perceived barriers and facilitators of participation in after-school physical activity by children with Autism Spectrum Disorders. *Journal of Developmental and Physical Disabilities*, 23, 195–211. https://doi.org/10.1007/s10882-010-9215-z

Obrusnikova, I., & Miccinello, D. L. (2012). Parent Perceptions of Factors Influencing After-School Physical Activity of Children With Autism Spectrum Disorders. *Adapted Physical Activity Quarterly, 29*, 63–80. https://doi.org/10.1123/apaq.29.1.63

Paluska, S. A., & Schwenk, T. L. (2000). Physical Activity and Mental Health. *Sports Medicine, 29*, 167–180. https://doi.org/10.2165/00007256-200029030-00003

Pan, C.-Y. (2008). Objectively measured physical activity between children with Autism Spectrum Disorders and children without disabilities during inclusive recess settings in Taiwan. *Journal of Autism and Developmental Disorders, 38*, 1292. https://doi.org/10.1007/s10803-007-0518-6

Pan, C.-Y. (2010). Effects of water exercise swimming program on aquatic skills and social behaviors in children with autism spectrum disorders. *Autism, 14*, 9–28. https://doi.org/10.1177/1362361309339496

Pitetti, K. H., Rendoff, A. D., Grover, T., & Beets, M. W. (2007). The efficacy of a 9-month treadmill walking program on the exercise capacity and weight reduction for adolescents with severe autism. *Journal of Autism and Developmental Disorders, 37*, 997–1006. https://doi.org/10.1007/s10803-006-0238-3

Powell, C. (2003). The Delphi technique: Myths and realities. *Journal of Advanced Nursing, 41*, 376–382. https://doi.org/10.1046/j.1365-2648.2003.02537.x

Sallis, James. F., & Owen, N. (2015). Ecological Models of Health Behavior. In K. Glanz, B. K. Rimer, & K. Viswanath (Eds.), Health Behavior: Theory, Research, and Practice (Fifth). San Francisco, CA, US: Jossey-Bass.

Samson, A. C. (2013). Humor(lessness) elucidated - Sense of humour in individuals with Autism Spectrum Disorders: Review and introduction. *International Journal of Humor Research, 26*, 393-409. https://doi.org/10.1515/humor-2013-0027.

Sanderson, H. (2000). Person Centred Planning: Key features and approaches. York: Joseph Rowntree Foundation.

Saury, J., & Durand, M. (1998). Practical knowledge in expert coaches: On-site study of coaching in sailing. *Research Quarterly for Exercise and Sport, 69*, 254–266. https://doi.org/10.1080/02701367.1998.10607692

Simonoff, E., Pickles, A., Charman, T., Chandler, S., Loucas, T., & Baird, G. (2008). Psychiatric disorders in children with autism spectrum disorders: Prevalence, comorbidity, and associated factors in a population-derived sample. *Journal of the American Academy of Child and Adolescent Psychiatry, 47*, 921–929. https://doi.org/10.1097/CHI.0b013e318179964f

Sowa, M., & Meulenbroek, R. (2012). Effects of physical exercise on Autism Spectrum Disorders: A meta-analysis. *Research in Autism Spectrum Disorders, 6*, 46–57. https://doi.org/10.1016/j.rasd.2011.09.001

Sport England. (2018). Active Lives Survey, 2015-2016. Retrieved from http://doi.org/10.5255/UKDA-SN-8223-2

Srinivasan, S. M., Pescatello, L. S., & Bhat, A. N. (2014). Current perspectives on physical activity and exercise recommendations for children and adolescents with Autism Spectrum Disorders. *Physical Therapy, 94*, 875–889. https://doi.org/10.2522/ptj.20130157

Tracy, S. J. (2010). Qualitative quality: Eight "Big-Tent" criteria for excellent qualitative research. *Qualitative Inquiry, 16*, 837–851. https://doi.org/10.1177/1077800410383121

Townsend, R. C., Smith, B., & Cushion, C. J. (2015). Disability sports coaching: Towards a critical understanding. *Sports Coaching Review, 4*, 80–98. https://doi.org/10.1080/21640629.2016.1157324

Vella, S. A., Oades, L. G., & Crowe, T. P. (2010). The application of coach leadership models to coaching practice: Current state and future directions. *International Journal of Sports Science & Coaching, 5*, 425–434. https://doi.org/10.1260/1747-9541.5.3.425

Warburton, D. E. R., Nicol, C. W., & Bredin, S. S. D. (2006). Health benefits of physical activity: The evidence. *CMAJ : Canadian Medical Association Journal, 174*, 801–809. https://doi.org/10.1503/cmaj.051351

Willig, C. (1999). Beyond appearances: A critical realist approach to social constructionism. In D. Nightingale & J. Cromby (Eds.), Social Constructionist Psychology: A Critical Analysis of Theory and Practice (256). McGraw-Hill Education (UK).

Yardley, L. (2008). Demonstrating validity in qualitative psychology. In J. A. Smith (Ed.),*Qualitative Psychology* (2nd ed., pp. 235–251). London: Sage.

Yilmaz, I., Yanardağ, M., Birkan, B., & Bumin, G. (2004). Effects of swimming training on physical fitness and water orientation in autism. *Pediatrics International*, *46*, 624–626. https://doi.org/10.1111/j.1442-200x.2004.01938.x

Section C

Appendix of Supporting Material

Appendix A: Quality Appraisal Checklists

Observation & Interview (2017)

Part I: Mixed Methods Appraisal Tool (MMAT), version 2018

Category of study designs	Methodological quality criteria	Responses			
		Yes	No	Can't tell	Comments
Screening questions (for all types)	S1. Are there clear research questions?	✓			
	S2. Do the collected data allow to address the research questions?	✓			
	Further appraisal may not be feasible or appropriate when the answer is 'No' or 'Can't tell' to one or both screening questions.				
1. Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	✓			
	1.2. Are the qualitative data collection methods adequate to address the research question?	✓			
	1.3. Are the findings adequately derived from the data?	✓			
	1.4. Is the interpretation of results sufficiently substantiated by data?	✓			
	1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	✓			
2. Quantitative randomized controlled trials	2.1. Is randomization appropriately performed?				
	2.2. Are the groups comparable at baseline?				
	2.3. Are there complete outcome data?				
	2.4. Are outcome assessors blinded to the intervention provided?				
	2.5 Did the participants adhere to the assigned intervention?				
3. Quantitative non-randomized	3.1. Are the participants representative of the target population?				
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?				
	3.3. Are there complete outcome data?				
	3.4. Are the confounders accounted for in the design and analysis?				
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?				
4. Quantitative descriptive	4.1. Is the sampling strategy relevant to address the research question?	✓			
	4.2. Is the sample representative of the target population?		✓		
	4.3. Are the measurements appropriate?	✓			
	4.4. Is the risk of nonresponse bias low?	✓			
	4.5. Is the statistical analysis appropriate to answer the research question?	✓			
5. Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?	✓			
	5.2. Are the different components of the study effectively integrated to answer the research question?	✓			
	5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	✓			
	5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?		✓		
	5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	✓			

Good study & appropriate use of mixed method.

Ayvazoglu, Kozub, Butera, & Murray (2015)

Part I: Mixed Methods Appraisal Tool (MMAT), version 2018

Category of study designs	Methodological quality criteria	Responses			
		Yes	No	Can't tell	Comments
Screening questions (for all types)	S1. Are there clear research questions?	✓			
	S2. Do the collected data allow to address the research questions?	✓			
	Further appraisal may not be feasible or appropriate when the answer is 'No' or 'Can't tell' to one or both screening questions.				
1. Qualitative	1.1. Is the qualitative approach appropriate to answer the research question?	✓			
	1.2. Are the qualitative data collection methods adequate to address the research question?	✓			
	1.3. Are the findings adequately derived from the data?	✓			
	1.4. Is the interpretation of results sufficiently substantiated by data?	✓			
	1.5. Is there coherence between qualitative data sources, collection, analysis and interpretation?	✓			
2. Quantitative randomized controlled trials	2.1. Is randomization appropriately performed?				
	2.2. Are the groups comparable at baseline?				
	2.3. Are there complete outcome data?				
	2.4. Are outcome assessors blinded to the intervention provided?				
	2.5 Did the participants adhere to the assigned intervention?				
3. Quantitative non-randomized	3.1. Are the participants representative of the target population?				
	3.2. Are measurements appropriate regarding both the outcome and intervention (or exposure)?				
	3.3. Are there complete outcome data?				
	3.4. Are the confounders accounted for in the design and analysis?				
	3.5. During the study period, is the intervention administered (or exposure occurred) as intended?				
4. Quantitative descriptive	4.1. Is the sampling strategy relevant to address the research question?	✓			
	4.2. Is the sample representative of the target population?		✓		
	4.3. Are the measurements appropriate?	✓			
	4.4. Is the risk of nonresponse bias low?	✓			
	4.5. Is the statistical analysis appropriate to answer the research question?	✓			small n.
5. Mixed methods	5.1. Is there an adequate rationale for using a mixed methods design to address the research question?	✓			
	5.2. Are the different components of the study effectively integrated to answer the research question?	✓			
	5.3. Are the outputs of the integration of qualitative and quantitative components adequately interpreted?	✓			
	5.4. Are divergences and inconsistencies between quantitative and qualitative results adequately addressed?	✓			
	5.5. Do the different components of the study adhere to the quality criteria of each tradition of the methods involved?	✓			

Appropriate to include but consider impact of small sample size and non-representative sample.

THE JOANNA BRIGGS INSTITUTE

JBI Critical Appraisal Checklist for Case Series

Reviewer Alex Hiles Date 19/1/18

Author Lamb, Richards & Adams Year 2016 Record Number

	Yes	No	Unclear	Not applicable
1. Were there clear criteria for inclusion in the case series?	☑	☐	☐	☐
2. Was the condition measured in a standard, reliable way for all participants included in the case series?	☑	☐	☐	☐
3. Were valid methods used for identification of the condition for all participants included in the case series?	☑	☐	☐	☐
4. Did the case series have consecutive inclusion of participants?	☑	☐	☐	☐
5. Did the case series have complete inclusion of participants?	☐	☐	☑	☐
6. Was there clear reporting of the demographics of the participants in the study?	☑	☐	☐	☐
7. Was there clear reporting of clinical information of the participants?	☑	☐	☐	☐
8. Were the outcomes or follow up results of cases clearly reported?	☑	☐	☐	☐
9. Was there clear reporting of the presenting site(s)/clinic(s) demographic information?	☐	☐	☑	☐
10. Was statistical analysis appropriate?	☑	☐	☐	☐

Overall appraisal: Include ☑ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

Some aspects that were missing but generally standard was acceptable.

THE JOANNA BRIGGS INSTITUTE

JBI Critical Appraisal Checklist for Analytical Cross Sectional Studies

Reviewer Alex Miller Date 17/11/18

Author Stanish et al Year 2015 Record Number

	Yes	No	Unclear	Not applicable
1. Were the criteria for inclusion in the sample clearly defined?	☑	☐	☐	☐
2. Were the study subjects and the setting described in detail?	☑	☐	☐	☐
3. Was the exposure measured in a valid and reliable way?	☑	☐	☐	☐
4. Were objective, standard criteria used for measurement of the condition?	☑	☐	☐	☐
5. Were confounding factors identified?	☐	☐	☑	☐
6. Were strategies to deal with confounding factors stated?	☐	☐	☑	☐
7. Were the outcomes measured in a valid and reliable way?	☑	☐	☐	☐
8. Was appropriate statistical analysis used?	☑	☐	☐	☐

Overall appraisal: Include ☑ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

Generally a good standard of paper. Limited discussion of confounding factors.

THE JOANNA BRIGGS INSTITUTE

JBI Critical Appraisal Checklist for Analytical Cross Sectional Studies

Reviewer Alex Hill Date 19/11/18

Author Mustafa, Phillips, Cortis, & Davidson Year 2015 Record Number

	Yes	No	Unclear	Not applicable
1. Were the criteria for inclusion in the sample clearly defined?	☐	☑	☐	☐
2. Were the study subjects and the setting described in detail?	☑	☐	☐	☐
3. Was the exposure measured in a valid and reliable way?	☑	☐	☐	☐
4. Were objective, standard criteria used for measurement of the condition?	☑	☐	☐	☐
5. Were confounding factors identified?	☑	☐	☐	☐
6. Were strategies to deal with confounding factors stated?	☐	☐	☑	☐
7. Were the outcomes measured in a valid and reliable way?	☑	☐	☐	☐
8. Was appropriate statistical analysis used?	☑	☐	☐	☐

Overall appraisal: Include ☑ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

Mostly acceptable, some limitations with regard to confounding factors & inclusion criteria

THE JOANNA BRIGGS INSTITUTE

JBI Critical Appraisal Checklist for Analytical Cross Sectional Studies

Reviewer Alex Hiles Date 19/11/18

Author Lee, Haegele, & Zhang Year 2017 Record Number

	Yes	No	Unclear	Not applicable
1. Were the criteria for inclusion in the sample clearly defined?	☐	☑	☐	☐
2. Were the study subjects and the setting described in detail?	☑	☐	☐	☐
3. Was the exposure measured in a valid and reliable way?	☑	☐	☐	☐
4. Were objective, standard criteria used for measurement of the condition?	☑	☐	☐	☐
5. Were confounding factors identified?	☐	☑	☐	☐
6. Were strategies to deal with confounding factors stated?	☐	☑	☐	☐
7. Were the outcomes measured in a valid and reliable way?	☑	☐	☐	☐
8. Was appropriate statistical analysis used?	☑	☐	☐	☐

Overall appraisal: Include ☑ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

Not a wholly clear paper to read with some aspects missing but generally acceptable.

THE JOANNA BRIGGS INSTITUTE

JBI Critical Appraisal Checklist for Qualitative Research

Reviewer Alex Hiles Date 19/11/18

Author Arnell, Terlinder & Lundqvist Year 2018 Record Number

		Yes	No	Unclear	Not applicable
1.	Is there congruity between the stated philosophical perspective and the research methodology?	☐	☑	☐	☐
2.	Is there congruity between the research methodology and the research question or objectives?	☑	☐	☐	☐
3.	Is there congruity between the research methodology and the methods used to collect data?	☑	☐	☐	☐
4.	Is there congruity between the research methodology and the representation and analysis of data?	☑	☐	☐	☐
5.	Is there congruity between the research methodology and the interpretation of results?	☑	☐	☐	☐
6.	Is there a statement locating the researcher culturally or theoretically?	☑	☐	☐	☐
7.	Is the influence of the researcher on the research, and vice- versa, addressed?	☐	☐	☑	☐
8.	Are participants, and their voices, adequately represented?	☑	☐	☐	☐
9.	Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	☑	☐	☐	☐
10.	Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	☑	☐	☐	☐

Overall appraisal: Include ☑ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

Not much on philosophical position & bias but otherwise good.

THE JOANNA BRIGGS INSTITUTE

JBI Critical Appraisal Checklist for Qualitative Research

Reviewer Alex Hiles Date 17/11/19

Author Blagrave Year 2017 Record Number

		Yes	No	Unclear	Not applicable
1.	Is there congruity between the stated philosophical perspective and the research methodology?	☑	☐	☐	☐
2.	Is there congruity between the research methodology and the research question or objectives?	☑	☐	☐	☐
3.	Is there congruity between the research methodology and the methods used to collect data?	☑	☐	☐	☐
4.	Is there congruity between the research methodology and the representation and analysis of data?	☑	☐	☐	☐
5.	Is there congruity between the research methodology and the interpretation of results?	☑	☐	☐	☐
6.	Is there a statement locating the researcher culturally or theoretically?	☑	☐	☐	☐
7.	Is the influence of the researcher on the research, and vice- versa, addressed?	☐	☑	☐	☐
8.	Are participants, and their voices, adequately represented?	☑	☐	☐	☐
9.	Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	☑	☐	☐	☐
10.	Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	☑	☐	☐	☐

Overall appraisal: Include ☑ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

Bias not reported on but otherwise good

THE JOANNA BRIGGS INSTITUTE

JBI Critical Appraisal Checklist for Qualitative Research

Reviewer Alex Hiles Date 19/11/18

Author Grieger et al Year 2018 Record Number

		Yes	No	Unclear	Not applicable
1.	Is there congruity between the stated philosophical perspective and the research methodology?	☑	☐	☐	☐
2.	Is there congruity between the research methodology and the research question or objectives?	☑	☐	☐	☐
3.	Is there congruity between the research methodology and the methods used to collect data?	☑	☐	☐	☐
4.	Is there congruity between the research methodology and the representation and analysis of data?	☑	☐	☐	☐
5.	Is there congruity between the research methodology and the interpretation of results?	☑	☐	☐	☐
6.	Is there a statement locating the researcher culturally or theoretically?	☐	☑	☐	☐
7.	Is the influence of the researcher on the research, and vice- versa, addressed?	☐	☑	☐	☐
8.	Are participants, and their voices, adequately represented?	☑	☐	☐	☐
9.	Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	☑	☐	☐	☐
10.	Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	☑	☐	☐	☐

Overall appraisal: Include ☑ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

Bias not reported on but otherwise good.

THE JOANNA BRIGGS INSTITUTE

JBI Critical Appraisal Checklist for Qualitative Research

Reviewer Alex Hiles Date 19/11/18

Author Healy, Msetfi & Gallagher Year 2013 Record Number

		Yes	No	Unclear	Not applicable
1.	Is there congruity between the stated philosophical perspective and the research methodology?	☑	☐	☐	☐
2.	Is there congruity between the research methodology and the research question or objectives?	☑	☐	☐	☐
3.	Is there congruity between the research methodology and the methods used to collect data?	☑	☐	☐	☐
4.	Is there congruity between the research methodology and the representation and analysis of data?	☑	☐	☐	☐
5.	Is there congruity between the research methodology and the interpretation of results?	☑	☐	☐	☐
6.	Is there a statement locating the researcher culturally or theoretically?	☑	☐	☐	☐
7.	Is the influence of the researcher on the research, and vice- versa, addressed?	☑	☐	☐	☐
8.	Are participants, and their voices, adequately represented?	☑	☐	☐	☐
9.	Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	☑	☐	☐	☐
10.	Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	☑	☐	☐	☐

Overall appraisal: Include ☑ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

Meets all criteria

THE JOANNA BRIGGS INSTITUTE

JBI Critical Appraisal Checklist for Qualitative Research

Reviewer Alex Hiles Date 19/11/18

Author May Year 2018 Record Number

		Yes	No	Unclear	Not applicable
1.	Is there congruity between the stated philosophical perspective and the research methodology?	☐	☐	☑	☐
2.	Is there congruity between the research methodology and the research question or objectives?	☑	☐	☐	☐
3.	Is there congruity between the research methodology and the methods used to collect data?	☑	☐	☐	☐
4.	Is there congruity between the research methodology and the representation and analysis of data?	☑	☐	☐	☐
5.	Is there congruity between the research methodology and the interpretation of results?	☑	☐	☐	☐
6.	Is there a statement locating the researcher culturally or theoretically?	☐	☑	☐	☐
7.	Is the influence of the researcher on the research, and vice- versa, addressed?	☐	☑	☐	☐
8.	Are participants, and their voices, adequately represented?	☑	☐	☐	☐
9.	Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	☑	☐	☐	☐
10.	Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	☑	☐	☐	☐

Overall appraisal: Include ☑ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

Little attention paid to philosophical stance of bias but generally good paper

THE JOANNA BRIGGS INSTITUTE

JBI Critical Appraisal Checklist for Qualitative Research

Reviewer Alex Hiles Date 19/11/18

Author Obrusnikova & Cavalier Year 2011 Record Number

		Yes	No	Unclear	Not applicable
1.	Is there congruity between the stated philosophical perspective and the research methodology?	☑	☐	☐	☐
2.	Is there congruity between the research methodology and the research question or objectives?	☑	☐	☐	☐
3.	Is there congruity between the research methodology and the methods used to collect data?	☑	☐	☐	☐
4.	Is there congruity between the research methodology and the representation and analysis of data?	☑	☐	☐	☐
5.	Is there congruity between the research methodology and the interpretation of results?	☑	☐	☐	☐
6.	Is there a statement locating the researcher culturally or theoretically?	☐	☑	☐	☐
7.	Is the influence of the researcher on the research, and vice- versa, addressed?	☐	☐	☑	☐
8.	Are participants, and their voices, adequately represented?	☑	☐	☐	☐
9.	Is the research ethical according to current criteria or, for recent studies, and is there evidence of ethical approval by an appropriate body?	☑	☐	☐	☐
10.	Do the conclusions drawn in the research report flow from the analysis, or interpretation, of the data?	☑	☐	☐	☐

Overall appraisal: Include ☑ Exclude ☐ Seek further info ☐

Comments (Including reason for exclusion)

Little attention paid to bias or theoretical stance of researchers but good otherwise

Appendix B: Interview Schedule for Coaches

Interview schedule for coaches

1. Tell me a bit about how you got involved in coaching athletes with ASC
2. Do you have any experiences working with individuals with ASC outside of sports? If so, can you tell me a bit about them?
3. What have you noticed, if anything, is different about coaching athletes with an ASC?
4. What challenges are there for you, as coaches in working with athletes with an ASC?
5. What positive things have you noticed in your coaching of athletes with an ASC?
6. What aspects of sports participation do you see athletes with ASC struggle with most? Mastery of technical skills or managing the rules for example.
7. What are the most helpful strategies you have implemented in your coaching of athletes with an ASC?
8. And what are the strategies or techniques that haven't worked so well?
9. Are there any resources you have used or come across that have been helpful for your coaching of athletes with ASC?
10. Is there anything you wish you had known when you first started coaching athletes with ASC?
11. If you were to give a friend three top tips on how to accommodate an athlete's ASC, what would you tell them?
12. Is there anything else that comes to mind that you think it would be helpful for me to know? Or any experiences you have had that might help other people in coaching athletes with ASC?

Appendix C: Ethical Approval from Salomons Ethics Panel

Salomons Centre for Applied Psychology

Alexandra Hiles
Trainee Clinical Psychologist
Canterbury Christ Church University

12 January 2018

Direct line 01227 92 7094
E-mail margie.callanan@canterbury,ac.uk
Our Ref V:\075\Ethics\2017-18

Dear Alexandra,

Investigating best coaching practice in sports for adolescents with an Autism Spectrum Condition (ASC)

Outcome: Full Approval

Thank you for addressing the points raised by the Ethics Panel so thoroughly, we are pleased to offer you approval for your proposed study.

We look forward to receiving a short report on progress and outcome on completion of the research, in order to complete our file. The report should be the same one that is provided to your participants. Please note that any changes of substance to the research will need to be notified to us so that we can ensure continued appropriate ethical process.

We wish you well with your study and hope that you enjoy carrying it out.

Yours sincerely,

Margie Callanan

Professor Margie Callanan
Chair of the Salomons Ethics Panel

Cc Professor Jan Burns

School of Psychology, Politics and Sociology
Faculty of Social and Applied Sciences

Canterbury Christ Church University
Runcie Court David Salomons Estate
Broomhill Road Tunbridge Wells Kent TN3 0TF (UK)
Tel +44 (0)333 011 7102 Fax +44 (0)1892 520888
www.canterbury.ac.uk

Professor Rama Thirunamachandran, Vice-Chancellor and Principal

Registered Company No: 4793659
A Company limited by guarantee
Registered Charity No: 1098136

Appendix D: Amendment letter sent to Salomons Ethics Chair

Canterbury Christ Church University

Salomons Centre for Applied Psychology

22nd February 2019

Dear Margie,

I am writing to request an amendment to my ethics approval. Our original plan for the research was as follows:

"The research project consists of two phases. Phase A will elicit views of experts in the field of coaching athletes with ASC. Experts in the field are defined for this research study as individuals with at least three years of experience in coaching athletes with ASC. Phase B will use these data to inform individualised coaching interventions with pairs of athletes with ASC and coaches."

While we have completed phase A of the research, difficulties with recruitment and participant injury (leading them to not be able to participate in sports or the study) have meant we have been unable to complete phase B as planned. We would like now to use phase B as a mechanism of validation of phase A data. This will allow us to gain feedback from young people with Autism on their experience of sports participation and on the data collected from coaches in phase A. This will allow us to determine whether coaches and young people are in line with their thinking regarding what works well and what barriers or facilitators there are to sports participation.

Attached are the proposed information sheet, interview questions and consent form for young people.

Please let me know if you would like any further details.

Yours sincerely,

Alexandra Hiles

Trainee Clinical Psychologist

Cc: Tracy Plunkett

Appendix E: Approval from Ethics Chair regarding amendment request

Dear Alex,

Thank you for the notification of this amendment. This is all in order, however, please check the time that data have to be stored for: on your information sheet it states 5 years and it may be that a minimum of 6 years is needed. Please check this with your Programme Research Director before finally sending the information sheet out.

Good luck with the research.

All best wishes,
Margie

Professor Margie Callanan
Programme Director of Clinical Psychology Doctorate
Director of Salomons Centre for Applied Psychology

Appendix F: End of study letter to Participants and Ethics panel

Dear [name],

Project Title: Sports participation for individual's with Autism Spectrum Condition (ASC)

As you may recall, in the summer of last year you were kind enough to take part in my research study. Since all of my data has been collected and analysed, I am writing this summary to tell you about what I found.

Aim of project: We were aiming to explore coaches' experiences of working with young people with a diagnosis of Autism Spectrum Condition (ASC) in sporting environments. We were particularly interested in what coaches thought about this work and what aspects of it were most challenging, as well as what strategies were most helpful in combatting these challenges. I interviewed a total of ten coaches and two young people with ASC. The coaches all completed the same interview with me, and the athletes and I discussed some of the findings together to see what they thought about the answers the coaches gave. By doing this, we were able to gain a good insight in to what coaches felt was important for us to know about coaching young people with ASC.

Findings: To analyse the interviews, I looked at the data for similarities and differences between coaches experiences. I found that lots of participant's felt it was important to get to know the young person with ASC really well and to work in a person-centred way. I also discovered that, while there were some strategies that might work well for lots of people with ASC, for example, having a structure and well-defined boundaries, and using brief and clear instructions, other factors needed to be considered on a more individual basis. For example, getting to know the young person's sensory needs, or getting used to their communication style. This was important to discover because, it means we need to do more work to understand what works best and for who. What I did find out that was very satisfying though, is that all of the coaches loved what they did and found disability sports coaching both rewarding and exciting.

I hope you enjoyed participating. I was so pleased to talk with so many coaches who are working so hard to include young people with ASC in sport. Your contribution to the interviews was enormously beneficial and very much appreciated. I am hopeful this study will help those working with young people with ASC and will encourage more coaches to include them in their training sessions.

If you have any questions about the study, please do not hesitate to contact me on the email address below.

Yours sincerely,

Alex Hiles

Trainee Clinical Psychologist

a.f.hiles796@canterbury.ac.uk

Appendix G: Participant Information Sheet

Canterbury Christ Church University

Information sheet for Coaches (phase A)

Study title:

Investigating best sports coaching practice for adolescents with an Autism Spectrum Condition (ASC).

Researchers:

Alexandra Hiles (Trainee Clinical Psychologist)

Professor Jan Burns

Dr. Mark Murphy

1. Why are we doing this research?

Research suggests that people diagnosed with an Autism Spectrum Condition (ASC) are less likely to take part in sports than those without an ASC. We know that regular exercise is good for both physical and mental health as well as general wellbeing.

Despite this, there has been little research investigating the benefits of sports participation for individuals with an ASC. As such, we are planning a two-phased research study.

Phase A: we will gather ideas about coaching strategies from experts in the field (coaches who work with athletes with ASC). This will be collected via telephone interviews.

Phase B: we will use the information from phase 1, along with assessment data, to guide an individualised coaching intervention plan for pairs of athletes with an ASC and their sports coach.

We hope to gain a better understanding of what helps or hinders athletes with autism in relation to coaching practice. Upon completion of the study, materials will be developed to distribute locally to help coaches get the most from their athletes. Feedback will also be given to coaches and athletes involved in the study on their individual outcomes.

2. Why was I invited to take part?

We hope to speak to coaches who work with athletes with an ASC as your real-world experience provides expert knowledge that isn't available in the literature. This knowledge is therefore crucial in the development of coaching strategies and interventions.

3. What will the study involve?

If you decide to take part, the first thing we will do is ask you to sign a consent form to say you agree to participate. You will then be invited to take part in a telephone interview with the researcher. The interview will be approximately 30 minutes long and will involve answering questions about your experiences of working with athletes with an ASC.

4. Other important information.

Confidentiality: the interview will be recorded and the recording will be stored on a password protected memory stick. All data will be anonymized if used in the final write up, for example if quotations are included.

Withdrawing from the study: you are free to withdraw from the study at any time and do not have to provide a reason for doing so. This includes stopping the interview if you wish.

5. What's good about taking part?

Taking part will help us to understand what it's like to coach athletes with an ASC. As not much has been written about the best strategies for coaching athletes with an ASC, it will be helpful for us to hear from experts in the field. We will then be able to use this information to guide our interventions and subsequently, help to improve coaching and make sports clubs more accessible.

6. What are the possible disadvantages of taking part?

Taking part in this project is not expected to cause you any harm or distress but will require about 30-40 minutes of your time. Should you wish to discontinue your participation this can be done at any stage.

7. What if there is a problem?

If you would like to make a complaint about the study, you should contact the head of research at Salomons Centre for Applied Psychology: Paul.camic@canterbury.ac.uk

7. How do I get involved?

If you would like to take part in the study, please contact the researchers on the details below:

Send an email to Alexandra Hiles on:

a.f.hiles796@canterbury.ac.uk

OR

Telephone 01227927090

(please leave a voicemail for Alexandra Hiles with your name and contact telephone number)

Appendix H: Participant Consent Form

Investigating best sports coaching practice for adolescents with an Autism Spectrum Condition (ASC).

Researcher: Alexandra Hiles

Participant Identification Number for this study:

Please initial box

1. I confirm that I have read and understand the information sheet dated 01/03/2018 (version 6) for the above study. I have had the opportunity to think through the information, ask questions and I am happy with the answers provided. ☐

2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason. ☐

3. I understand that data collected during the study may be looked at by the lead supervisor Jan Burns. I give permission for the lead researcher and lead supervisor to have access to my data. ☐

4. I agree that quotes from my interview may be used in published reports of the study findings with all information that might identify me removed. ☐

5. I agree to my interview being digitally recorded and for the data to be saved on a password protected memory stick. ☐

6. I agree to take part in the above study. ☐

Name of Participant: _____

Date: _____

Signature: _____

Person taking consent: _____

Date: _____

Signature: _____

Appendix I: Coded Example Transcript (originally coded using nvivo)

Appendix J: Extracts from Research Diary

Appendix K: Interview Schedule for Athletes

Interview schedule for athletes

SPORTS PARTICIPATION

1. Tell me a bit about what sports you play?
2. How many years have you been playing this sport?
3. What sort of sports club, if any, do you go to? (mainstream vs. disability club)
4. Who do you play sports with?
5. How many times per week do you train for you sport?
6. How long does your training session last?
7. What type of competition (if any) do you compete at?

COACHING

8. Can you tell me a bit about your coach?
9. How long has your coach been coaching you for?
10. Can you tell me three things that you think are helpful about your coaching?
    - What does your coach do that helps you to perform or play better?
    - What do you like about your coaches training sessions?
11. Can you tell me about a time when your coach helped you to perform better? What did they do?
    - Have you ever found it hard to learn a skill and your coach helped you learn it? What did they do?
    - Have you ever felt like you didn't want to train or compete and your coach has helped you? What did they do?
12. Would you like to change anything about your coaching?
    - Is there anything your coach does that you don't like so much?
    - Can you think of a better way that your coach could do this?
13. In the past, can you tell me about a part of your coaching that didn't help you?
14. Is there anything else you would say about your coaching experience?

VALIDATION

These are some ideas from our coaches, can you tell me how much you agree with them, with 1 being “I do not agree at all” and 10 being “I completely agree”

1. Having a structure to the session is important, so athletes know what to expect

   1 ——————————————————————— 10

   Why do you think they said this?

2. It is best to use short and clear instructions

   1 ——————————————————————— 10

   Why do you think they said this?

3. Teamwork and big group activities can be difficult; small group games tend to work best

   1 ——————————————————————— 10

   Why do you think they said this?

4. Playing sports is a good way to help with making friends

   1 ——————————————————————— 10

   Why do you think they said this?

5. Getting to know your athlete is very important

   1 ——————————————————————— 10

   Why do you think they said this?

Appendix L: Participant Information Sheet for YP with ASC

Canterbury Christ Church University

Information sheet for athletes

Name of research project:

Investigating best sports coaching practice for adolescents with an Autism Spectrum Condition (ASC).

Researchers:

Alexandra Hiles (Trainee Clinical Psychologist, Salomon's Centre for Applied Psychology)

Professor Jan Burns (Canterbury Christ Church University)

Dr. Mark Murphy (National Autistic Society)

Version 7: 22/02/2019

Why are we doing this research?

- The main researcher is Alexandra Hiles, but people call me Alex she is doing a doctorate degree in Clinical Psychology. This research project will be an important part of her training.
- Research has told us that people diagnosed with an Autism Spectrum Condition (ASC) are less likely to take part in sports than those without an ASC.
- We know that taking part in sports is good for people. It is good for both their physical health and their mental health. It is also good for people's general wellbeing.
- We are interested in the views of individuals with an ASC on their experience of sports participation.
- We hope to use this knowledge to help us improve coaching for athletes with ASC.
- We also hope to better understand how sports participation might affect people's experiences of their ASC.

Why was I invited to take part?

- We have given you this leaflet because we would like teenagers who have a diagnosis of an ASC and who are currently taking part in a sports club to be involved in our research.

What will taking part be like?

- It is up to you if you would like to join the study. If you decide to take part, the first thing we will do is ask you if you agree to take part. You can agree either by signing your name or telling Alex.
- Next, you will be contacted by the researcher (Alex Hiles) by telephone, email or post (whichever you prefer).
- Together with Alex, you will arrange a meeting. This meeting could take place at your sports club, at your school, or if you would prefer, on the telephone or on Skype.
- During the meeting, Alex will ask you some questions about taking part in sports. She will ask you about what is good about doing sports, what is not so good and if there is anything that makes it easier or more difficult to take part. She will also tell you what some sports coaches think and ask if you agree or disagree with them.

What's good about taking part?

- Taking part will help us to understand what it's like for teenagers with an ASC to participate in sports. It will help us to improve coaching and make sports clubs more accessible.

What are the possible disadvantages of taking part?

- Some people might find it hard to talk with Alex about their experiences.
- If you decide to take part, it will also involve some of your time which some people might not be happy about.

Can I stop taking part in the research even if I say yes at the start?

- It is okay if you decide you do not want to take part any more. You can decide this at any point, even if you have started the meeting.
- You do not have to give a reason for stopping, just let Alex know that you would like to finish.
- If there are any questions that you do not want to answer, that's okay. Just tell Alex and she will move on.

What happens to the information I tell the researcher?

- The information will be anonymized (this means that any information that could identify who you are will be removed) before being written in a report.
- Once everybody's names and personal information is deleted, the data will be stored for five years from the end of the study.
- When the study is finished, it will be available for you to read if would like.

What if there is a problem?

- If you would like to make a complaint about the study, you can contact the head of research at Salomons Centre for Applied Psychology: Paul.camic@canterbury.ac.uk
- You can also tell your parent, caregiver or teacher as they have been given details of who to contact to make a complaint.

What if I want to know more about the study?

- If you would like more information about the study you can talk to the main researcher, Alex by contacting me on the details below.

How do I get involved?

- If you would like to take part in the study, or to find out more about it, please contact Alex on the details below:

- **Send an email** to Alex Hiles on: a.f.hiles796@canterbury.ac.uk

OR

- **Telephone** 01227927090

(please leave a voicemail for Alexandra Hiles with your name and contact telephone number)

Appendix M: Consent form for YP with ASC

Consent Form: Participant (Athlete version)

Centre Number:
Study Number:
Participant Identification Number for this study:

Investigating best sports coaching practice for adolescents with an Autism Spectrum Condition (ASC).

Researcher: Alexandra Hiles

Please initial box

1. I confirm that I have read and understand the information sheet dated 18/02/2019 (version 7) for the above study. I have had the opportunity to think through the information, ask questions and I am happy with the answers provided. ☐
2. I understand that my participation is voluntary and that I am free to withdraw at any time without giving any reason. ☐
3. I understand that data collected during the study may be looked at by the lead supervisor Jan Burns. I give permission for the lead researcher and lead supervisor to have access to my data. ☐
4. I agree that quotes from my interview may be used in published reports of the study findings with all information that might identify me removed. ☐
5. I agree to my interview being digitally recorded and for the data to be saved on a password protected memory stick. ☐
6. I agree to take part in the above study. ☐

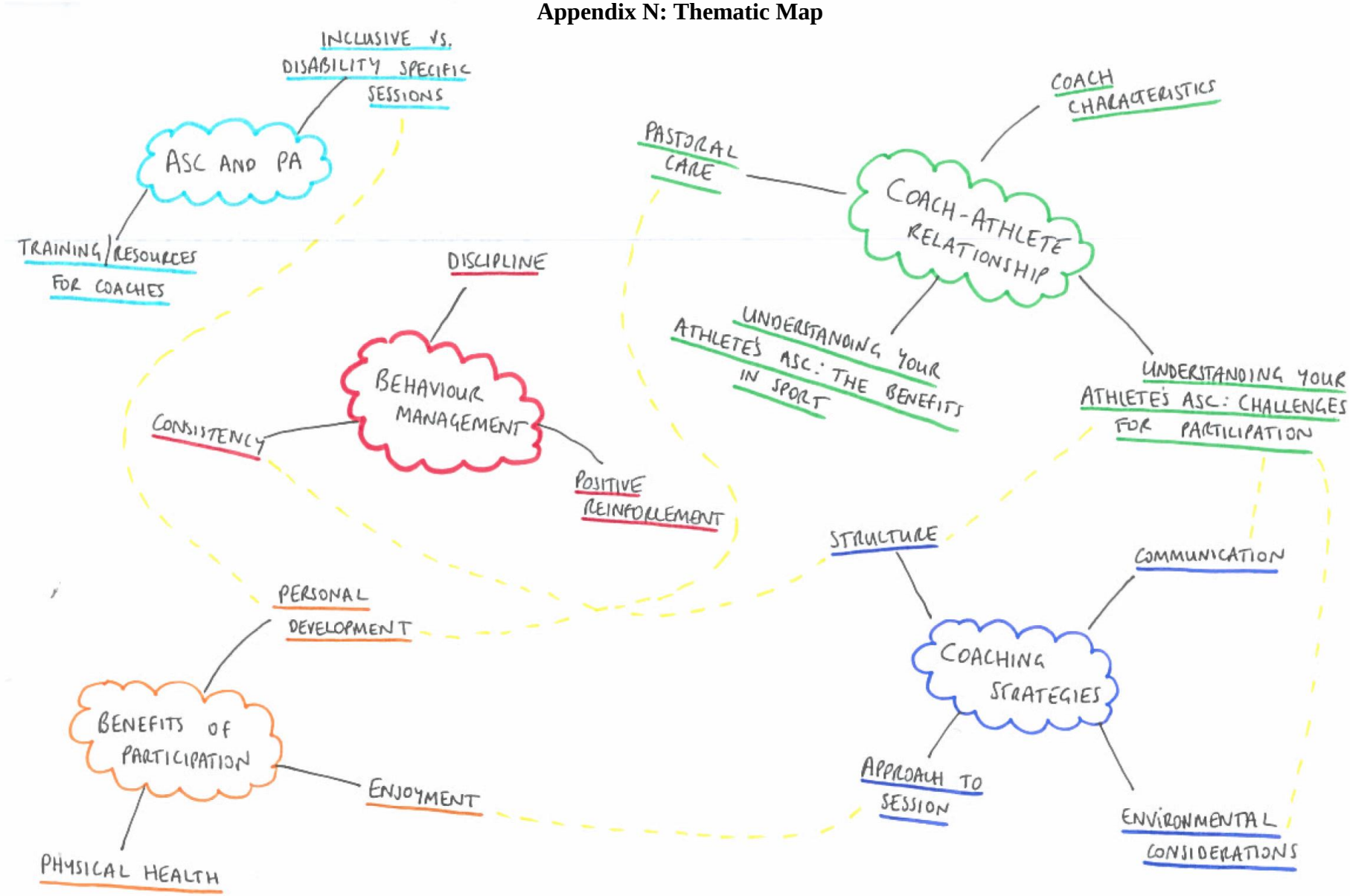
Name of Participant_____ Date_____

Signature _____

Name of Person taking consent _____ Date_____

Signature _____

Appendix N: Thematic Map



Appendix O: Table demonstrating Theme Development

Theme	Subtheme	Initial coding relating to subtheme	Example quote	Participant (P)
Coach-Athlete Relationship	Understanding your athlete's ASC: Challenges for participation	Communication difficulties	"Communication tends to be a bit of a challenge"	P3
		Get to know your athlete	"You kind of have to get to know the swimmer"	P1
		Social interactions	"It's a matter of knowing who you've got and who they like and who they dislike"	P4
		Sensory needs	"If it's wet the day before...he just doesn't like wet and dirty hands...he didn't engage because he didn't want to pick up the equipment"	P6
		Behaviour	"Behaviour can sometimes be an issue when you've got a large group of children"	P5
		Attention	"Her focus isn't always great because there are different things going on"	P9
		Anxiety	"Some people with ASD can get quite anxious thinking oh what the hell, what are we going to do today"	P7
		Teamwork	"Some of them will just do their own thing and forget they've got others on their team"	P4
		Motor skills	"Some young people will struggle like coordination wise"	P7
		Motivation	"Just motivating their child to go every single week. It's just like motivation is a big thing"	P2
	Understanding your athlete's ASC: The benefits in sport	Determination	We've had children who I think some of their focus and determination is rooted in the autism"	P5
		Enjoy repetition	"The willingness to repeat an action over and over again to the point where the majority of us would be really bored can be really helpful"	P5
		Good at rule following	"He sticks to the rules...rather than being had up all the time for misbehaving and breaking the rules"	P8
		Positive attitude	"There's this very positive attitude you know"	P4
		Information retention	"I think information retention...and the attention to detail...So what is shown and what is said should happen they will try remember exactly what I have said or done"	P6
		Special/intense interests	"Absolutely obsessed with badminton so they play it all the time"	P2
	Coach Characteristics	Tolerance	"Just being considerate to their situation"	P10
		Genuineness	"Firstly to be yourself and to be genuine"	P9

		Humour	"Be good and be funny"	P4
	Pastoral Care	Trust	"It's a lot of work to get young people to just float in the water, to get them to trust us"	P1
		Role modelling	"We are coaches first and foremost but then that would mean we are also mentors, models to the young people"	P6
		Providing reassurance	"A lot of it is reassurance"	P2
		Listening	"One of my great strengths is being able to sit there and listen to them"	P7
		Bullying/stigma	"So, there's a problem we've had swimmers who've been bullied"	P1
Strategies	Communication	Be concise	"Give really clear, concise instructions"	P9
		Visual Aids	"Provide more visual demonstrations"	P10
		Social Stories	"Social story books, or a planner of what's going to happen"	P1
		Visual learners	"I think people with ASD can kind of picture what you're saying. So a lot of the time you're explaining what to do but the more able one's in the group can actually picture what you're saying"	P7
		Repetition	"I would explain them a couple of times"	P3
		Type of language	"We don't want to be using sort of subtleties of language"	P5
		Body Language	"They might not be looking at you might not say yes I understand"	P6
		Literal interpretation	"Definitely taking things literally"	P9
		Set expectations	"Someone with autism really likes that routine and is just waiting for the next piece in the jigsaw for the next part of the session because they know it's coming along"	P6
	Structure	Routine	"If you say to them right, today we are going to do this that and the other, that you do exactly that, don't start trying to do other things because that sort of disrupts it a lot as well"	P9
		Flexibility	"It's never really set in stone"	P1
		Type of Activity	"[Football is] a very chaotic sport it's a very team based sport, but with how much that's going on you can easily lose control"	P2
		Planning	"I certainly would say I would plan the sessions a bit more"	P3
	Approach to Session	Patience	"Yeah, it's just about being very very patient"	P4
		Enjoy it	"Enjoy yourself with them. If you're enjoying it they will love it"	P7

		Person-centred	"Take the time to get to know the individual and what works them"	P5
	Environmental Considerations	Sensory considerations	"They might just say that's because he just doesn't like the feel of foam"	P6
		Safety	"It's quite enclosed and it feels very secure"	P10
		Staff ratio	"We have a lower ratio of Ps within the specialist sessions"	P10
		Equipment	The lane ropes we have in our second session on a Friday are brutal if you get too close to them"	P1
Benefits of participation	Personal Development	Improving social skills	"We're not just about getting them to swim, we're about trying to improve their social relationships as well so trying to improve those friendships"	P1
		Achieving goals	"I don't really mind what the personal-best is, I don't really mind how fast it is, every week we hope that you're working on *your* personal best"	P6
		Feeling included	"If you're in a team playing cricket or football or dodgeball or whatever it is, you've got that togetherness. People with ASD kind of struggle with that because they're used to doing things by themselves, they're comfortable in their own space, but if you find a sport or something they love then its just trying to help them to be like yeah you can do that, why don't you try it?"	P7
		Making friends	"They made new friends at the club's and the might only see, they might go to separate schools and come from different postcodes, but then they come together, it's a friend social network"	P6
		Life skills	"The sessions aren't just about sport, they're about cooperation, they're about integrating with other people, they're about life skills that are important to get by in general society"	P5
	Enjoyment	Fun	"Her parents have said that she loves it, we had to close during summer...she said oh God when are you open again because she hasn't stopped going on about"	P9
	Physical Health	Healthy lifestyle	"Definitely and just that healthy lifestyle"	P9
		Motor skills development	"Working on balance, timing, rhythm, coordination, spatial awareness, fine motor control, all of that kind of stuff is beneficial for everybody"	P10
Behaviour Management	Discipline	Parental/Carer Involvement	"Get a little bit of information from the carers in terms of each individuals ability"	P4
		No singling out	"Another thing that's quite important as well, is not singling them out"	P2
		1-to-1 explanations	"We will try to talk to that person to say, why did you do that...we spoke about how would you feel...we did talk about things to try and resolve things...there's an explanation behind the no"	P6

		Time to cool down	"If they're angry or stressed we say, do you want to have a bit of a break and a lot of the time they will have a break"	P7
		Not raising voice	"I think quite often raising your voice tends to get their attention, but I would say probably less so when I'm working with these individuals"	P4
	Positive Reinforcement	Praise	"Things like thumbs up and high fives"	P1
		Rewards	Then he could pick a reward before he gets in the pool that he has at the end"	P1
	Consistency	Clear rules	"There are certain rules that go with swimming for safety that the child"	P8
		Staff continuity	"So often with the younger kids we have, if we can help it we don't change the teacher"	P1
		Boundaries	"We say things like, we keep our hands to our self and there's no need to touch other people"	P5
ASC in Sport	Inclusive vs. Disability Specific sessions	Inclusion	"I've got a passion for inclusion but only when I feel it is the right inclusion"	P8
		Disability specific sessions	"We value sort of having specific sessions for specific people. So like having a specific ASD session where every1 there has ASD"	P2
		Affiliation to mainstream clubs	"We are a disability club, which is affiliated to a mainstream club...we've had children with autism sent to us from the club and we've also sent back to the clubs swimmers with autism. And we've also kept the one's who we know won't fit in to the situation there"	P8
		Pan-disability	"The thing I want our club to do is to be a bit of everything for everyone"	P10
		Competition	"Just because they have autism doesn't mean they can't rise to a really good standard, an elite standard"	P4
		Expectation	"His mum and dad have got massive expectations of him"	P9
	Training/Resources for Coaches	Trial and error	"I think it comes through a bit of trial and error"	P3
		Experience/knowledge	"Noone sort of explained to me what Autism was, and kind of what to expect from the group. It was kind of just getting thrown in and you just sort of learn for yourself"	P3
		Disability courses/training	"I don't think I've been on an autism specific course"	P6

Appendix P: Publication Guidelines for the Journal of Autism and Developmental Disorders

Psychology - Child & School Psychology | Journal of Autism and Developmental Disorders – incl. option to publish open access

Springer www.springer.com

Child & School Psychology Home > Psychology > Child & School Psychology

JOURNALS BOOKS SERIES TEXTBOOKS REFERENCE WORKS

Journal of Autism and Developmental Disorders

Editor-in-Chief: Fred R. Volkmar

ISSN: 0162-3257 (print version)
ISSN: 1573-3432 (electronic version)
Journal no. 10803

Read Online

151,50 € Personal Rate e-only

Get Subscription

Online subscription, valid from January through December of current calendar year
Immediate access to this year's issues via SpringerLink
1 Volume(-s) with 12 issue(-s) per annual subscription
Automatic annual renewal
More information: >> FAQs // >> Policy

ABOUT THIS JOURNAL EDITORIAL BOARD MEET THE EDITOR-IN-CHIEF VIDEOS CALL FOR PAPERS INSTRUCTIONS FOR AUTHORS

Instructions for Authors

EDITORIAL PROCEDURE

Double-Blind Peer Review

MANUSCRIPT FORMAT

All JADD manuscripts should be submitted to Editorial Manager in 12-point Times New Roman with standard 1-inch borders around the margins.

APA Style

Text must be double-spaced; APA Publication Manual standards must be followed.

As of January 20, 2011, the Journal has moved to a double-blind review process. Therefore, when submitting a new manuscript, DO NOT include any of your personal information (e.g., name, affiliation) anywhere within the manuscript. When you are ready to submit a manuscript to JADD, please be sure to upload these 3 separate files to the Editorial Manager site to ensure timely processing and review of your paper:

A title page with the running head, manuscript title, and complete author information. Followed by (page break) the Abstract page with keywords and the corresponding author e-mail information.
The blinded manuscript containing no author information (no name, no affiliation, and so forth).
The Author Note

TYPES OF PAPERS

Articles, Commentaries Brief Reports, Letters to the Editor

- The preferred article length is 20-23 double-spaced manuscript pages long (not including title page, abstract, tables, figures, addendums, etc.) Manuscripts of 40 double-spaced pages (references, tables and figures counted as pages) have been published. The reviewers or the editor for your review will advise you if a longer submission must be shortened.
- Special Issue Article: The Guest Editor may dictate the article length; maximum pages allowed will be based on the issue's page allotment.
- Commentary: Approximately 20-25 double-spaced pages maximum, with fewer references and tables/figures than a full-length article.
- A Brief Report: About 8 double-spaced pages with shorter references and fewer tables/figures. May not meet the demands of scientific rigor required of a JADD article – can be preliminary findings.
- A Letter to the Editor is 6 or less double spaced pages with shorter references, tables and figures.

Style sheet for Letter to the Editor:

- A title page with the running head, manuscript title, and complete author information including corresponding author e-mail information
- The blinded manuscript containing no author information (no name, no affiliation, and so forth):-

- 6 or less double spaced pages with shorter references, tables and figures

- Line 1: "Letter to the Editor"

- Line 3: begin title (note: for "Case Reports start with "Case Report: Title")

- Line 6: Text begins; references and tables, figure caption sheet, and figures may follow (page break between each and see format rules)

REVIEW YOUR MANUSCRIPT FOR THESE ELEMENTS

1. Order of manuscript pages

Title Page with all Author Contact Information & Abstract with keywords and the corresponding author e-mail information.

Blinded Manuscript without contact information and blinded Abstract, and References

Appendix

Figure Caption Sheet

Figures

Tables

Author Note

MANUSCRIPT SUBMISSION

Manuscript Submission

Submission of a manuscript implies: that the work described has not been published before; that it is not under consideration for publication anywhere else; that its publication has been approved by all co-authors, if any, as well as by the responsible authorities – tacitly or explicitly – at the institute where the work has been carried out. The publisher will not be held legally responsible should there be any claims for compensation.

Permissions

Authors wishing to include figures, tables, or text passages that have already been published elsewhere are required to obtain permission from the copyright owner(s) for both the print and online format and to include evidence that such permission has been granted when submitting their papers. Any material received without such evidence will be assumed to originate from the authors.

Online Submission

Please follow the hyperlink "Submit online" on the right and upload all of your manuscript files following the instructions given on the screen.

Please ensure you provide all relevant editable source files. Failing to submit these source files might cause unnecessary delays in the review and production process.

TITLE PAGE

The title page should include:

- The name(s) of the author(s)
- A concise and informative title
- The affiliation(s) and address(es) of the author(s)
- The e-mail address, telephone and fax numbers of the corresponding author

ABSTRACT

Please provide an abstract of 120 words or less. The abstract should not contain any undefined abbreviations or unspecified references.

KEYWORDS

Please provide 4 to 6 keywords which can be used for indexing purposes.

TEXT

Text Formatting

Manuscripts should be submitted in Word.

- Use a normal, plain font (e.g., 10-point Times Roman) for text.
- Use italics for emphasis.
- Use the automatic page numbering function to number the pages.
- Do not use field functions.
- Use tab stops or other commands for indents, not the space bar.
- Use the table function, not spreadsheets, to make tables.
- Use the equation editor or MathType for equations.
- Save your file in docx format (Word 2007 or higher) or doc format (older Word versions).

Headings

Please use no more than three levels of displayed headings.

Abbreviations

Abbreviations should be defined at first mention and used consistently thereafter.

Footnotes

Footnotes can be used to give additional information, which may include the citation of a reference included in the reference list. They should not consist solely of a reference citation, and they should never include the bibliographic details of a reference. They should also not contain any figures or tables.

Footnotes to the text are numbered consecutively; those to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data). Footnotes to the title or the authors of the article are not given reference symbols.

Always use footnotes instead of endnotes.

Acknowledgments

Acknowledgments of people, grants, funds, etc. should be placed in a separate section on the title page. The names of funding organizations should be written in full.

BODY

- The body of the manuscript should begin on a separate page. The manuscript page header (if used) and page number should appear in the upper right corner. Type the title of the paper centered at the top of the page, add a hard return, and then begin the text using the format noted above. The body should contain:
- Introduction (The introduction has no label.)
- Methods (Center the heading. Use un-centered subheadings such as: Participants, Materials, Procedure.)
- Results (Center the heading.)
- Discussion (Center the heading.)

HEADINGS

Please use no more than three levels of displayed headings.

Level 1: Centered

Level 2: Centered Italicized

Level 3: Flush left, Italicized

FOOTNOTES

Center the label "Footnotes" at the top of a separate page. Footnotes can be used to give additional information, which may include the citation of a reference included in the reference list. They should not consist solely of a reference citation, and they should never include the bibliographic details of a reference. They should also not contain any figures or tables.

Footnotes to the text are numbered consecutively; those to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data). Footnotes to the title or the authors of the article are not given reference symbols.

Always use footnotes instead of endnotes. Type all content footnotes and copyright permission footnotes together, double-spaced, and numbered consecutively in the order they appear in the article. Indent the first line of each footnote 5-7 spaces. The number of the footnote should correspond to the number in the text. Superscript arabic numerals are used to indicate the text material being footnoted.

AUTHOR NOTE

The first paragraph contains a separate phrase for each author's name and the affiliations of the authors at the time of the study (include region and country).

The second paragraph identifies any changes in the author affiliation subsequent to the time of the study and includes region and country (wording: "authors name is now at affiliation".)

The third paragraph is Acknowledgments. It identifies grants or other financial support and the source, if appropriate. It is also the place to acknowledge colleagues who assisted in the study and to mention any special circumstances such as the presentation of a version of the paper at a meeting, or its preparation from a doctoral dissertation, or the fact that it is based on an earlier study.

The fourth paragraph states, "Correspondence concerning this article should be addressed to..." and includes the full address, telephone number and email address of the corresponding author.

TERMINOLOGY

Please always use internationally accepted signs and symbols for units (SI units).

SCIENTIFIC STYLE

Generic names of drugs and pesticides are preferred; if trade names are used, the generic name should be given at first mention.
Please use the standard mathematical notation for formulae, symbols etc.:

Italic for single letters that denote mathematical constants, variables, and unknown quantities

Roman/upright for numerals, operators, and punctuation, and commonly defined functions or abbreviations, e.g., cos, det, e or exp, lim, log, max, min, sin, tan, d (for derivative)

Bold for vectors, tensors, and matrices.

REFERENCES

Citation

Cite references in the text by name and year in parentheses. Some examples:

Negotiation research spans many disciplines (Thompson 1990).
This result was later contradicted by Becker and Seligman (1996).
This effect has been widely studied (Abbott 1991; Barakat et al. 1995; Kelso and Smith 1998; Medvec et al. 1999).

Reference list

The list of references should only include works that are cited in the text and that have been published or accepted for publication. Personal communications and unpublished works should only be mentioned in the text. Do not use footnotes or endnotes as a substitute for a reference list.

Reference list entries should be alphabetized by the last names of the first author of each work.

- Journal article

  Harris, M., Karper, E., Stacks, G., Hoffman, D., DeNiro, R., Cruz, P., et al. (2001). Writing labs and the Hollywood connection. Journal of Film Writing, 44(3), 213–245.

- Article by DOI

  Slifka, M. K., & Whitton, J. L. (2000) Clinical implications of dysregulated cytokine production. Journal of Molecular Medicine, https://doi.org/10.1007/s001090000086

- Book

  Calfee, R. C., & Valencia, R. R. (1991). APA guide to preparing manuscripts for journal publication. Washington, DC: American Psychological Association.

- Book chapter

  O'Neil, J. M., & Egan, J. (1992). Men's and women's gender role journeys: Metaphor for healing, transition, and transformation. In B. R. Wainrib (Ed.), Gender issues across the life cycle (pp. 107–123). New York: Springer.

- Online document

Abou-Allaban, Y., Dell, M. L., Greenberg, W., Lomax, J., Peteet, J., Torres, M., & Cowell, V. (2006). Religious/spiritual commitments and psychiatric practice. Resource document. American Psychiatric Association. http://www.psych.org/edu/other_res/lib_archives/archives/200604.pdf. Accessed 25 June 2007.

Journal names and book titles should be italicized.

For authors using EndNote, Springer provides an output style that supports the formatting of in-text citations and reference list.

EndNote style (zip, 3 kB)

TABLES

- All tables are to be numbered using Arabic numerals.
- Tables should always be cited in text in consecutive numerical order.
- For each table, please supply a table caption (title) explaining the components of the table.
- Identify any previously published material by giving the original source in the form of a reference at the end of the table caption.
- Footnotes to tables should be indicated by superscript lower-case letters (or asterisks for significance values and other statistical data) and included beneath the table body.

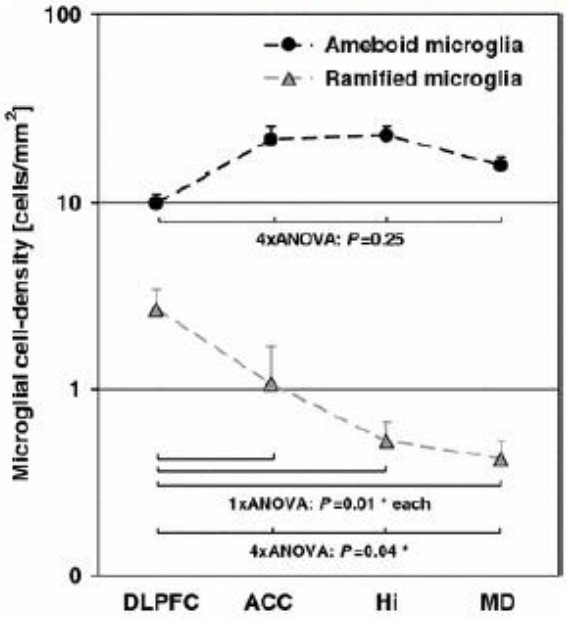
Each table should be inserted on a separate page at the back of the manuscript in the order noted above. A call-out for the correct placement of each table should be included in brackets within the text immediately after the phrase in which it is first mentioned. Copyright permission footnotes for tables are typed as a table note.

ARTWORK AND ILLUSTRATIONS GUIDELINES

Electronic Figure Submission

- Supply all figures electronically.
- Indicate what graphics program was used to create the artwork.
- For vector graphics, the preferred format is EPS; for halftones, please use TIFF format. MSOffice files are also acceptable.
- Vector graphics containing fonts must have the fonts embedded in the files.
- Name your figure files with "Fig" and the figure number, e.g., Fig1.eps.

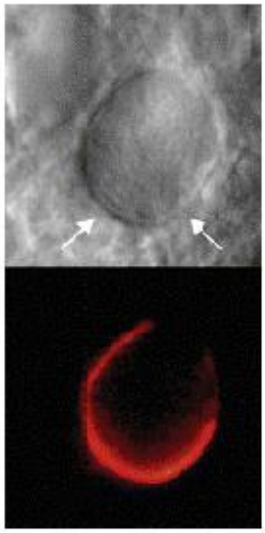
Line Art



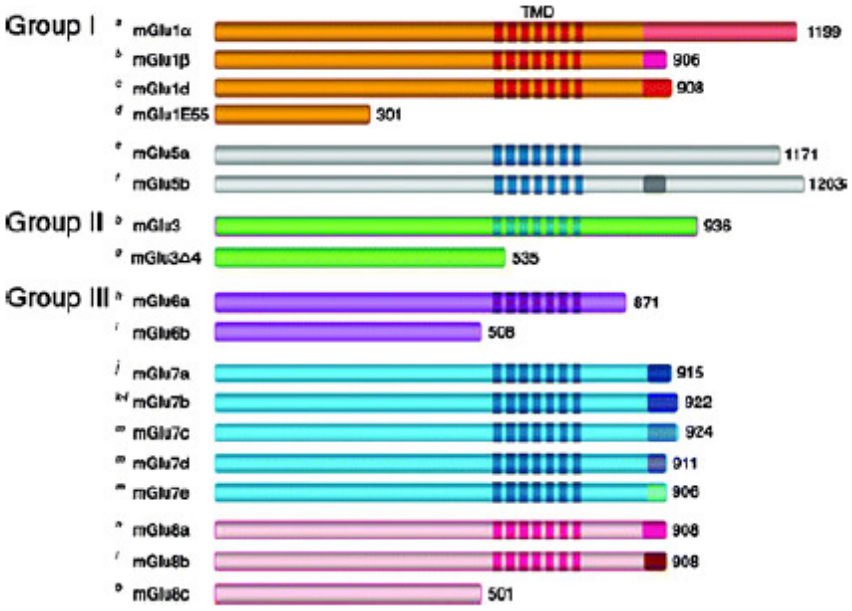
- Definition: Black and white graphic with no shading.
- Do not use faint lines and/or lettering and check that all lines and lettering within the figures are legible at final size.
- All lines should be at least 0.1 mm (0.3 pt) wide.
- Scanned line drawings and line drawings in bitmap format should have a minimum resolution of 1200 dpi.
- Vector graphics containing fonts must have the fonts embedded in the files.

Halftone Art

Definition: Photographs, drawings, or paintings with fine shading, etc.
If any magnification is used in the photographs, indicate this by using scale bars within the figures themselves.
Halftones should have a minimum resolution of 300 dpi.



Combination Art



Definition: a combination of halftone and line art, e.g., halftones containing line drawing, extensive lettering, color diagrams, etc.
Combination artwork should have a minimum resolution of 600 dpi.

Color Art

Color art is free of charge for online publication.
If black and white will be shown in the print version, make sure that the main information will still be visible. Many colors are not distinguishable from one another when converted to black and white. A simple way to check this is to make a xerographic copy to see if the necessary distinctions between the different colors are still apparent.
If the figures will be printed in black and white, do not refer to color in the captions.
Color illustrations should be submitted as RGB (8 bits per channel).

Figure Lettering

- To add lettering, it is best to use Helvetica or Arial (sans serif fonts).
- Keep lettering consistently sized throughout your final-sized artwork, usually about 2–3 mm (8–12 pt).
- Variance of type size within an illustration should be minimal, e.g., do not use 8-pt type on an axis and 20-pt type for the axis label.
- Avoid effects such as shading, outline letters, etc.
- Do not include titles or captions within your illustrations.

Figure Numbering

All figures are to be numbered using Arabic numerals.
Figures should always be cited in text in consecutive numerical order.
Figure parts should be denoted by lowercase letters (a, b, c, etc.).
If an appendix appears in your article and it contains one or more figures, continue the consecutive numbering of the main text. Do not number the appendix figures, "A1, A2, A3, etc." Figures in online appendices (Electronic Supplementary Material) should, however, be numbered separately.

Figure Captions

- Each figure should have a concise caption describing accurately what the figure depicts. Include the captions in the text file of the manuscript, not in the figure file.
- Figure captions begin with the term Fig. in bold type, followed by the figure number, also in bold type.
- No punctuation is to be included after the number, nor is any punctuation to be placed at the end of the caption.
- Identify all elements found in the figure in the figure caption; and use boxes, circles, etc., as coordinate points in graphs.
- Identify previously published material by giving the original source in the form of a reference citation at the end of the figure caption.

Figure Placement and Size

Figures should be submitted separately from the text, if possible.
When preparing your figures, size figures to fit in the column width.
For large-sized journals the figures should be 84 mm (for double-column text areas), or 174 mm (for single-column text areas) wide and not higher than 234 mm.
For small-sized journals, the figures should be 119 mm wide and not higher than 195 mm.

Permissions

If you include figures that have already been published elsewhere, you must obtain permission from the copyright owner(s) for both the print and online format. Please be aware that some publishers do not grant electronic rights for free and that Springer will not be able to refund any costs that may have occurred to receive these permissions. In such cases, material from other sources should be used.

Accessibility

In order to give people of all abilities and disabilities access to the content of your figures, please make sure that

All figures have descriptive captions (blind users could then use a text-to-speech software or a text-to-Braille hardware)
Patterns are used instead of or in addition to colors for conveying information (colorblind users would then be able to distinguish the visual elements)
Any figure lettering has a contrast ratio of at least 4.5:1

FIGURE CAPTION SHEET

The figure caption sheet contains a list of only the captions for all figures used. Center the label "Figure Captions" in uppercase and lowercase letters at the top of the page. Begin each caption entry flush left, and type the word "Figure", followed by the appropriate number and a period, all in italics. In the text of the caption (not italicized), capitalize only the first word and any proper nouns. If the caption is more than one line, double-space between the lines, and type the second and subsequent lines flush left. Table notes: Copyright permission footnotes for figures are typed as part of the figure caption.

Each figure should appear on a separate page. The page where the figure is found should have the figure number and the word "top"[ie, Figure 1 top] typed above the figure. Figures or illustrations (photographs, drawings, diagrams, and charts) are to be numbered in one consecutive series of arabic numerals. Figures may be embedded in the text of a Word or Wordperfect document. Electronic artwork submitted on disk may be in the TIFF, EPS or Powerpoint format (best is 1200 dpi for line and 300 dpi for half-tones and gray-scale art). Color art should be in the CYMK color space. Assistance will be provided by the system administrator if you do not have electronic files for figures; originals of artwork may be sent to the system administrator to be uploaded. *** After first mention in the body of the

manuscript, a call-out for the correct placement of each figure should be included in brackets on a separate line within the text.

ELECTRONIC SUPPLEMENTARY MATERIAL

Springer accepts electronic multimedia files (animations, movies, audio, etc.) and other supplementary files to be published online along with an article or a book chapter. This feature can add dimension to the author's article, as certain information cannot be printed or is more convenient in electronic form.

Before submitting research datasets as electronic supplementary material, authors should read the journal's Research data policy. We encourage research data to be archived in data repositories wherever possible.

Submission

Supply all supplementary material in standard file formats.
Please include in each file the following information: article title, journal name, author names; affiliation and e-mail address of the corresponding author.
To accommodate user downloads, please keep in mind that larger-sized files may require very long download times and that some users may experience other problems during downloading.

Audio, Video, and Animations

Aspect ratio: 16:9 or 4:3
Maximum file size: 25 GB
Minimum video duration: 1 sec
Supported file formats: avi, wmv, mp4, mov, m2p, mp2, mpg, mpeg, flv, mxf, mts, m4v, 3gp

Text and Presentations

Submit your material in PDF format; .doc or .ppt files are not suitable for long-term viability.
A collection of figures may also be combined in a PDF file.

Spreadsheets

Spreadsheets should be submitted as .csv or .xlsx files (MS Excel).

Specialized Formats

Specialized format such as .pdb (chemical), .wrl (VRML), .nb (Mathematica notebook), and .tex can also be supplied.

Collecting Multiple Files

It is possible to collect multiple files in a .zip or .gz file.

Numbering

If supplying any supplementary material, the text must make specific mention of the material as a citation, similar to that of figures and tables.
Refer to the supplementary files as "Online Resource", e.g., "... as shown in the animation (Online Resource 3)", "... additional data are given in Online Resource 4".
Name the files consecutively, e.g. "ESM_3.mpg", "ESM_4.pdf".

Captions

For each supplementary material, please supply a concise caption describing the content of the file.

Processing of supplementary files

Electronic supplementary material will be published as received from the author without any conversion, editing, or reformatting.

Accessibility

In order to give people of all abilities and disabilities access to the content of your supplementary files, please make sure that

The manuscript contains a descriptive caption for each supplementary material
Video files do not contain anything that flashes more than three times per second (so that users prone to seizures caused by such effects are not put at risk)

ETHICAL RESPONSIBILITIES OF AUTHORS

This journal is committed to upholding the integrity of the scientific record. As a member of the Committee on Publication Ethics (COPE) the journal will follow the COPE guidelines on how to deal with potential acts of misconduct.

Authors should refrain from misrepresenting research results which could damage the trust in the journal, the professionalism of scientific authorship, and ultimately the entire scientific endeavour. Maintaining integrity of the research and its presentation is helped by following the rules of good scientific practice, which include*:

- The manuscript should not be submitted to more than one journal for simultaneous consideration.
- The submitted work should be original and should not have been published elsewhere in any form or language (partially or in full), unless the new work concerns an expansion of previous work. (Please provide transparency on the re-use of material to avoid the concerns about text-recycling ('self-plagiarism').
- A single study should not be split up into several parts to increase the quantity of submissions and submitted to various journals or to one journal over time (i.e. 'salami-slicing/publishing').
- Concurrent or secondary publication is sometimes justifiable, provided certain conditions are met. Examples include: translations or a manuscript that is intended for a different group of readers.
- Results should be presented clearly, honestly, and without fabrication, falsification or inappropriate data manipulation (including image based manipulation). Authors should adhere to discipline-specific rules for acquiring, selecting and processing data.
- No data, text, or theories by others are presented as if they were the author's own ('plagiarism'). Proper acknowledgements to other works must be given (this includes material that is closely copied (near verbatim), summarized and/or paraphrased), quotation marks (to indicate words taken from another source) are used for verbatim copying of material, and permissions secured for material that is copyrighted.
- **Important note: the journal may use software to screen for plagiarism.**
- Authors should make sure they have permissions for the use of software, questionnaires/(web) surveys and scales in their studies (if appropriate).
- Authors should avoid untrue statements about an entity (who can be an individual person or a company) or descriptions of their behavior or actions that could potentially be seen as personal attacks or allegations about that person.
- Research that may be misapplied to pose a threat to public health or national security should be clearly identified in the manuscript (e.g. dual use of research).

Examples include creation of harmful consequences of biological agents or toxins, disruption of immunity of vaccines, unusual hazards in the use of chemicals, weaponization of research/technology (amongst others).

- Authors are strongly advised to ensure the author group, the Corresponding Author, and the order of authors are all correct at submission. Adding and/or deleting authors during the revision stages is generally not permitted, but in some cases may be warranted. Reasons for changes in authorship should be explained in detail. Please note that changes to authorship cannot be made after acceptance of a manuscript.

Upon request authors should be prepared to send relevant documentation or data in order to verify the validity of the results presented. This could be in the form of raw data, samples, records, etc. Sensitive information in the form of confidential or proprietary data is excluded.

*All of the above are guidelines and authors need to make sure to respect third parties rights such as copyright and/or moral rights.

If there is suspicion of misbehavior or alleged fraud the Journal and/or Publisher will carry out an investigation following COPE guidelines. If, after investigation, there are valid concerns, the author(s) concerned will be contacted under their given e-mail address and given an opportunity to address the issue. Depending on the situation, this may result in the Journal's and/or Publisher's implementation of the following measures, including, but not limited to:

If the manuscript is still under consideration, it may be rejected and returned to the author.
If the article has already been published online, depending on the nature and severity of the infraction:

- an erratum/correction may be placed with the article

- an expression of concern may be placed with the article

- or in severe cases retraction of the article may occur. The reason will be given in the published erratum, expression of concern or retraction note. Please note that retraction means that the article is **maintained on the platform**, watermarked "retracted" and the explanation for the retraction is provided in a note linked to the watermarked article.

The author's institution may be informed
A notice of suspected transgression of ethical standards in the peer review system may be included as part of the author's and article's bibliographic record.

Fundamental errors

Authors have an obligation to correct mistakes once they discover a significant error or inaccuracy in their published article. The author(s) is/are requested to contact the journal and explain in what sense the error is impacting the article. A decision on how to correct the literature will depend on the nature of the error. This may be a correction or retraction. The retraction note should provide transparency which parts of the article are impacted by the error.

Suggesting / excluding reviewers

Authors are welcome to suggest suitable reviewers and/or request the exclusion of certain individuals when they submit their manuscripts. When suggesting reviewers, authors should make sure they are totally independent and not connected to the work in any way. It is strongly recommended to suggest a mix of reviewers from different countries and different institutions. When suggesting reviewers, the Corresponding Author must provide an institutional email address for each suggested reviewer, or, if this is not possible to include other means of verifying the identity such as a link to a personal homepage, a link to the publication record or a researcher or author ID in the submission letter. Please note that the Journal may not use the suggestions, but suggestions are appreciated and may help facilitate the peer review process.

COMPLIANCE WITH ETHICAL STANDARDS

To ensure objectivity and transparency in research and to ensure that accepted principles of ethical and professional conduct have been followed, authors should include information regarding sources of funding, potential conflicts of interest (financial or non-financial), informed consent if the research involved human participants, and a statement on welfare of animals if the research involved animals.

Authors should include the following statements (if applicable) in a separate section entitled "Compliance with Ethical Standards" when submitting a paper:

Disclosure of potential conflicts of interest
Research involving Human Participants and/or Animals
Informed consent

Please note that standards could vary slightly per journal dependent on their peer review policies (i.e. single or double blind peer review) as well as per journal subject discipline. Before submitting your article check the instructions following this section carefully.

The corresponding author should be prepared to collect documentation of compliance with ethical standards and send if requested during peer review or after publication.

The Editors reserve the right to reject manuscripts that do not comply with the above-mentioned guidelines. The author will be held responsible for false statements or failure to fulfill the above-mentioned guidelines.

DISCLOSURE OF POTENTIAL CONFLICTS OF INTEREST

Authors must disclose all relationships or interests that could influence or bias the work. Although an author may not feel there are conflicts, disclosure of relationships and interests affords a more transparent process, leading to an accurate and objective assessment of the work. Awareness of real or perceived conflicts of interests is a perspective to which the readers are entitled and is not meant to imply that a financial relationship with an organization that sponsored the research or compensation for consultancy work is inappropriate. Examples of potential conflicts of interests **that are directly or indirectly related to the research** may include but are not limited to the following:

- Research grants from funding agencies (please give the research funder and the grant number)
- Honoraria for speaking at symposia
- Financial support for attending symposia
- Financial support for educational programs
- Employment or consultation
- Support from a project sponsor
- Position on advisory board or board of directors or other type of management relationships
- Multiple affiliations
- Financial relationships, for example equity ownership or investment interest
- Intellectual property rights (e.g. patents, copyrights and royalties from such rights)
- Holdings of spouse and/or children that may have financial interest in the work

In addition, interests that go beyond financial interests and compensation (non-financial interests) that may be important to readers should be disclosed. These may include but are not limited to personal relationships or competing interests directly or indirectly tied to this research, or professional interests or personal beliefs that may influence your research.

The corresponding author collects the conflict of interest disclosure forms from all authors. In author collaborations where formal agreements for representation allow it, it is sufficient for the corresponding author to sign the disclosure form on behalf of all authors. Examples of forms can be found

here:

The corresponding author will include a summary statement **on the title page that is separate from their manuscript**, that reflects what is recorded in the potential conflict of interest disclosure form(s).

See below examples of disclosures:

Funding: This study was funded by X (grant number X).

Conflict of Interest: Author A has received research grants from Company A. Author B has received a speaker honorarium from Company X and owns stock in Company Y. Author C is a member of committee Z.

If no conflict exists, the authors should state:

Conflict of Interest: The authors declare that they have no conflict of interest.

RESEARCH INVOLVING HUMAN PARTICIPANTS AND/OR ANIMALS

1) Statement of human rights

When reporting studies that involve human participants, authors should include a statement that the studies have been approved by the appropriate institutional and/or national research ethics committee and have been performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments or comparable ethical standards.

If doubt exists whether the research was conducted in accordance with the 1964 Helsinki Declaration or comparable standards, the authors must explain the reasons for their approach, and demonstrate that the independent ethics committee or institutional review board explicitly approved the doubtful aspects of the study.

If a study was granted exemption from requiring ethics approval, this should also be detailed in the manuscript (including the name of the ethics committee that granted the exemption and the reasons for the exemption).

Authors must - in all situations as described above - include the name of the ethics committee and the reference number where appropriate.

The following statements should be included in the text before the References section:

Ethical approval: "All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee (include name of committee + reference number) and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards."

Ethical approval retrospective studies

Although retrospective studies are conducted on already available data or biological material (for which formal consent may not be needed or is difficult to obtain) ethical approval may be required dependent on the law and the national ethical guidelines of a country. Authors should check with their institution to make sure they are complying with the specific requirements of their country.

2) Statement on the welfare of animals

The welfare of animals used for research must be respected. When reporting experiments on animals, authors should indicate whether the international, national, and/or institutional guidelines for the care and use of animals have been followed, and that the studies have been approved by a research ethics committee at the institution or practice at which the studies were conducted (where such a committee exists). Please provide the name of ethics committee and relevant permit number.

For studies with animals, the following statement should be included in the text before the References section:

Ethical approval: "All applicable international, national, and/or institutional guidelines for the care and use of animals were followed."

If applicable (where such a committee exists): "All procedures performed in studies involving animals were in accordance with the ethical standards of the institution or practice at which the studies were conducted.(include name of committee + permit number)"

If articles do not contain studies with human participants or animals by any of the authors, please select one of the following statements:

"This article does not contain any studies with human participants performed by any of the authors."

"This article does not contain any studies with animals performed by any of the authors."

"This article does not contain any studies with human participants or animals performed by any of the authors."

INFORMED CONSENT

All individuals have individual rights that are not to be infringed. Individual participants in studies have, for example, the right to decide what happens to the (identifiable) personal data gathered, to what they have said during a study or an interview, as well as to any photograph that was taken. Hence it is important that all participants gave their informed consent in writing prior to inclusion in the study. Identifying details (names, dates of birth, identity numbers and other information) of the participants that were studied should not be published in written descriptions, photographs, and genetic profiles unless the information is essential for scientific purposes and the participant (or parent or guardian if the participant is incapable) gave written informed consent for publication. Complete anonymity is difficult to achieve in some cases, and informed consent should be obtained if there is any doubt. For example, masking the eye region in photographs of participants is inadequate protection of anonymity. If identifying characteristics are altered to protect anonymity, such as in genetic profiles, authors should provide assurance that alterations do not distort scientific meaning.

The following statement should be included:

Informed consent: "Informed consent was obtained from all individual participants included in the study."

If identifying information about participants is available in the article, the following statement should be included:

"Additional informed consent was obtained from all individual participants for whom identifying information is included in this article."

ENGLISH LANGUAGE EDITING

For editors and reviewers to accurately assess the work presented in your manuscript you need to ensure the English language is of sufficient quality to be understood. If you need help with writing in English you should consider:

- Asking a colleague who is a native English speaker to review your manuscript for clarity.
- Visiting the English language tutorial which covers the common mistakes when writing in English.
- Using a professional language editing service where editors will improve the English to ensure that your meaning is clear and identify problems that require your review. Two such services are provided by our affiliates Nature Research Editing Service and American Journal Experts. Springer authors are entitled to a 10% discount on their first submission to either of these services, simply follow the links below.

English language tutorial

Nature Research Editing Service

American Journal Experts

Please note that the use of a language editing service is not a requirement for publication in this journal and does not imply or guarantee that the article will be selected for peer review or accepted.

If your manuscript is accepted it will be checked by our copyeditors for spelling and formal style before publication.

.

为便于编辑和评审专家准确评估您稿件中陈述的研究工作，您需要确保您的英语语言质量足以令人理解。如果您需要英文写作方面的帮助，您可以考虑：

- 请一位以英语为母语的同事审核您的稿件是否表意清晰。
- 查看一些有关英语写作中常见语言错误的教程。
- 使用专业语言编辑服务，编辑人员会对英语进行润色，以确保您的意思表达清晰，并识别需要您复核的问题。我们的附属机构 Nature Research Editing Service 和合作伙伴 American Journal Experts 即可提供此类服务。

教程

Nature Research Editing Service

American Journal Experts

请注意，使用语言编辑服务并非在期刊上发表文章的必要条件，同时也并不意味或保证文章将被选中进行同行评议或被接受。

如果您的稿件被接受，在发表之前，我们的文字编辑会检查您的文稿拼写是否规范以及文体是否正式。

.

エディターと査読者があなたの論文を正しく評価するには、使用されている英語の質が十分に高いことが必要とされます。英語での論文執筆に際してサポートが必要な場合には、次のオプションがあります：

・英語を母国語とする同僚に、原稿で使用されている英語が明確であるかをチェックしてもらう。

・英語で執筆する際のよくある間違いに関する英語のチュートリアルを参照する。

・プロの英文校正サービスを利用する。校正者が原稿の意味を明確にしたり、問題点を指摘し、英語の質を向上させます。Nature Research Editing Service と American Journal Experts の2つは弊社と提携しているサービスです。Springer の著者は、いずれのサービスも初めて利用する際には10%の割引を受けることができます。以下のリンクを参照ください。

英語のチュートリアル

Nature Research Editing Service

American Journal Experts

英文校正サービスの利用は、投稿先のジャーナルに掲載されるための条件ではないこと、また論文審査や受理を保証するものではないことに留意してください。

原稿が受理されると、出版前に弊社のコピーエディターがスペルと体裁のチェックを行います。

.

영어 원고의 경우, 에디터 및 리뷰어들이 귀하의 원고에 실린 결과물을 정확하게 평가할 수 있도록, 그들이 충분히 이해할 수 있을 만한 수준으로 작성되어야 합니다. 만약 영작문과 관련하여 도움을 받기를 원하신다면 다음의 사항들을 고려하여 주십시오:

- 귀하의 원고의 표현을 명확히 해줄 영어 원어민 동료를 찾아서 리뷰를 의뢰합니다.
- 영어 튜토리얼 페이지에 방문하여 영어로 글을 쓸 때 자주하는 실수들을 확인합니다.

- 리뷰에 대비하여, 원고의 의미를 명확하게 해주고 리뷰에서 요구하는 문제점들을 식별해서 영문 수준을 향상시켜주는 전문 영문 교정 서비스를 이용합니다. Nature Research Editing Service와 American Journal Experts에서 저희와 협약을 통해 서비스를 제공하고 있습니다. Springer 저자들이 본 교정 서비스를 첫 논문 투고를 위해 사용하시는 경우 10%의 할인이 적용되며, 아래의 링크를 통하여 확인이 가능합니다.

영어 튜토리얼 페이지

Nature Research Editing Service

American Journal Experts

영문 교정 서비스는 게재를 위한 요구사항은 아니며, 해당 서비스의 이용이 피어 리뷰에 논문이 선택되거나 게재가 수락되는 것을 의미하거나 보장하지 않습니다.

원고가 수락될 경우, 출판 전 저희측 편집자에 의해 원고의 철자 및 문체를 검수하는 과정을 거치게 됩니다.

RESEARCH DATA POLICY

The journal encourages authors, where possible and applicable, to deposit data that support the findings of their research in a public repository. Authors and editors who do not have a preferred repository should consult Springer Nature's list of repositories and research data policy.

List of Repositories

Research Data Policy

General repositories - for all types of research data - such as figshare and Dryad may also be used.

Datasets that are assigned digital object identifiers (DOIs) by a data repository may be cited in the reference list. Data citations should include the minimum information recommended by DataCite: authors, title, publisher (repository name), identifier.

DataCite

Springer Nature provides a research data policy support service for authors and editors, which can be contacted at **researchdata@springernature.com**.

This service provides advice on research data policy compliance and on finding research data repositories. It is independent of journal, book and conference proceedings editorial offices and does not advise on specific manuscripts.

Helpdesk

AFTER ACCEPTANCE

Upon acceptance of your article you will receive a link to the special Author Query Application at Springer's web page where you can sign the Copyright Transfer Statement online and indicate whether you wish to order OpenChoice, offprints, or printing of figures in color.

Once the Author Query Application has been completed, your article will be processed and you will receive the proofs.

Copyright transfer

Authors will be asked to transfer copyright of the article to the Publisher (or grant the Publisher exclusive publication and dissemination rights). This will ensure the widest possible protection and dissemination of information under copyright laws.

Offprints

Offprints can be ordered by the corresponding author.

Color illustrations

Online publication of color illustrations is free of charge. For color in the print version, authors will be expected to make a contribution towards the extra costs.

Proof reading

The purpose of the proof is to check for typesetting or conversion errors and the completeness and accuracy of the text, tables and figures. Substantial changes in content, e.g., new results, corrected values, title and authorship, are not allowed without the approval of the Editor.

After online publication, further changes can only be made in the form of an Erratum, which will be hyperlinked to the article.

Online First

The article will be published online after receipt of the corrected proofs. This is the official first publication citable with the DOI. After release of the printed version, the paper can also be cited by issue and page numbers.

OPEN CHOICE

Open Choice allows you to publish open access in more than 1850 Springer Nature journals, making your research more visible and accessible immediately on publication.

Article processing charges (APCs) vary by journal – view the full list

Benefits:

- Increased researcher engagement: Open Choice enables access by anyone with an internet connection, immediately on publication.
- Higher visibility and impact: In Springer hybrid journals, OA articles are accessed 4 times more often on average, and cited 1.7 more times on average*.
- Easy compliance with funder and institutional mandates: Many funders require open access publishing, and some take compliance into account when assessing future grant applications.

It is easy to find funding to support open access – please see our funding and support pages for more information.

*) Within the first three years of publication. Springer Nature hybrid journal OA impact analysis, 2018.

- Open Choice
- Funding and Support pages

Copyright and license term – CC BY

Open Choice articles do not require transfer of copyright as the copyright remains with the author. In opting for open access, the author(s) agree to publish the article under the Creative Commons Attribution License.

- Find more about the license agreement

AUTHORS' CONTRIBUTIONS

To give appropriate credit to each author of a paper, the individual contributions of authors to the manuscript should be specified in this section.

An "author" is generally considered to be someone who has made substantive intellectual contributions to a published study. To qualify as an author one should 1) have made substantial contributions to conception and design, or acquisition of data, or analysis and

interpretation of data; 2) have been involved in drafting the manuscript or revising it critically for important intellectual content; and 3) have given final approval of the version to be published. Each author should have participated sufficiently in the work to take public responsibility for appropriate portions of the content. Acquisition of funding, collection of data, or general supervision of the research group, alone, does not justify authorship.

We suggest the following kind of format (please use initials to refer to each author's contribution): AB conceived of the study, participated in its design and coordination and drafted the manuscript; JY participated in the design and interpretation of the data; MT participated in the design and coordination of the study and performed the measurement; ES participated in the design of the study and performed the statistical analysis; FG conceived of the study, and participated in its design and coordination and helped to draft the manuscript. All authors read and approved the final manuscript.

All contributors who do not meet the criteria for authorship should be listed in an acknowledgements section. Examples of those who might be acknowledged include a person who provided purely technical help, writing assistance, or a department chair who provided only general support.

NOTE: Because the Journal of Autism and Developmental Disorders operates double-blind peer review, the Authors' contributions section should be uploaded as part of the acknowledgment file, and not included in the main manuscript file.

Download Product Flyer

Shipping Dates

Order Back Issues

Bulk Orders

Article Reprints

Listen to Dr Volkmar on Aspergers/Autism...

Springer Nature 2019 Media Kit (pdf, 98...

Advertising Rate Card 2019 (pdf, 52 kB)

ALERTS FOR THIS JOURNAL

Get the table of contents of every new issue published in Journal of Autism and Developmental Disorders.

LOGIN

Please send me information on new Springer publications in Child and School Psychology.